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GOOD ROADS IN THE UNITED STATES.

BY

ALBERT PERRY BRIGHAM.

When Washington first went to the Ohio country, before the French and Indian War, he began to see that roads must be built across the mountains to tie the West to the colonies by the sea. This interest he never lost, and it shaped his private action and public policy so long as he lived. The greatest of our early Federal statesmen took up the cause, and the first decades of the nineteenth century were marked by the planning and building of great highways. When Ohio was admitted to the Union, in 1803, the enactment was accompanied by a law setting apart the proceeds from sales of public lands in Ohio for the building of a highway. Here was the origin of the Cumberland Road, for which the first contracts were let in 1811. The stumps were to be removed for a width of four rods, the roadbed was to be thirty feet wide, and the road was to be surfaced with a heavy cover of broken stone. West of the Monongahela the maximum grade was  $4\frac{1}{2}$  degrees; and in the western sections of the road, where stone was not accessible the material used was gravel. Thus by successive appropriations the great highway through Ohio, to the westward, was brought to completion and became known in pre-eminence as the National Road, although by no means the only road for which Federal money was set apart.

In 1817 Calhoun gave expression to the general sentiment when he urged that the Republic be bound together by a "perfect system of roads and canals." He would have a trunk line from Maine to Louisiana, a connection of the lakes with the Hudson

River, and would join to the western States all the great commercial centres on the Atlantic.

The cessation of this period of splendid road-building came about 1836, and is ascribed to the financial crisis of that period; but we can see another and more controlling reason. The day of railways had dawned, and it became plain that the long hauls must be made by steam. The iron roads took the field, and absorbed the resources and ambitions of progressive men, and the dirt road, and sometimes those who traversed it, sank from view. Of what account is an earth road when a locomotive can go fast and pull enormous loads? When, by and by, the capitalist could go swiftly and in comfort from New York to Chicago, and the member of Congress could draw his mileage and be whirled from San Francisco to Washington, why should they concern themselves about the country roads? Were they not as good as they had ever been? And why, after all, should a farmer, who gets his pace behind a plough, wish to go faster? Thus the dirt road became more dusty in summer and more deep in winter for seventy-five years. Nobody seemed to appreciate the fact that a million and a half of miles of dirt roads crossed the land everywhere, and that more millions of men and beasts must daily use them. The State of Iowa has a hundred thousand miles of these roads, and she spent upon them every year between two and three millions of dollars, but under a worn-out or rather an always bad plan that gave her little to show for it but mud of finer grain and greater depth. To-day this great State has adopted a money system in place of the old plan of loafing out a road tax under the direction of incompetent pathmasters.

This new understanding of our vast road problem began to show itself about twenty years ago, and the interest has so risen that good earth roads in America are but a question of time. The farmer is beginning to know that he is the factor of first industrial importance, and the capitalist and the statesman are also finding that whatever helps agriculture helps the town and city and blesses every citizen. The farmer, at least in the States of the east, has seen toilsome and even profitless years in recent times. Keep the farm up as he might by increasing toil, he has seen the selling value of his land go steadily down, and he has dragged his loads of produce to an indifferent market, in vain competition with the great farmer of the prairies, and has seen himself distanced in the acquirement of a competence by the tradesmen and skilled mechanics of the towns.

How far the decline in value of what he owns, or is trying to

own, is due to bad roads and expensive hauling he does not know, but he is beginning to suspect that good roads would go far to bring back to him a reasonable prosperity. The net shrinkage in the value of the farmer's property in the Empire State from 1890 to 1900 was more than \$69,000,000. Thoughtful men have again and again urged that this shrinkage is largely due to bad roads, and the present writer has seen no attempt to dispute this claim. It is what Professor J. A. Holmes, the champion of good roads in North Carolina, calls the "mud, sand and hill tax." This covers the case for North Carolina, with her mountains, her Piedmont, and her coastal plain. In New York we should shorten it to mud and hill tax; for we have our share of sticky soil, and the pioneers arranged that a road should rarely go around a hill when it was possible to go up a hill and down again. In Illinois it is enough to drop all the rest and call it mud tax, pure and simple. Shall we see what it is? Professor Holmes places the amount of it in his State at \$10,000,000 per year, or, as a good roads convention orator put it, it is the same as if the farmers of North Carolina should each year kill every horse and mule in the State and buy new with clean cash; or, one-tenth of the waste would give a seven months term to every school in the State.

The highway experts of Maryland make the very moderate estimate that bad roads in this State handicap their people to the extent of \$3,000,000 annually. It costs about one billion dollars to haul the farm products of the United States to market each year. Of this vast sum \$600,000,000 are wasted on account of bad roads.

Much attention has been given to the relative cost of the several modes of transporting freight. The unit chosen for comparison is the ton-mile—that is, the cost of carrying one ton of produce, of an average sort, a distance of one mile. Basing their conclusion on correspondence with 10,000 farmers, the Office of Public Road Inquiries puts the cost per ton-mile on dirt roads at 25 cents. On the railway the figure is  $\frac{3}{4}$  of one cent, or less. By water the rate varies between  $\frac{1}{4}$  and  $\frac{1}{12}$  of a cent. As compared with the ocean rate we are informed that for the canal we must multiply by 5; for rail, by 15; and when we come to the wagon on the country road we must take 500 for our multiplier.

The cost per ton-mile on the New York Central Railway in 1869 was 2  $\frac{4}{10}$  cents. In 1893 the cost had gone down to  $\frac{7}{10}$  of a cent. But where has been any reduction of the cost of the farmer's preliminary haul, except when, in recent years, improved roads have been built? How much has he been helped as he has jolted

to market over the sods and cobblestones thrown into the middle of the roads by the pathmasters? In a good roads convention held in Raleigh in 1902 it was said without contradiction that it was as cheap to take freight from California to the eastern seaboard as to bring produce from farms fifteen miles away into Raleigh.

Through the consular offices of the United States it has been possible to learn the cost of highway transportation in European countries. About Leeds, in Yorkshire, a two-horse team makes a ten-mile trip, going and returning, in a day, and pulls about  $2\frac{1}{4}$  tons, making six trips each week, at a cost of \$2.40 a trip. About Sheffield the rate is 8 to 12 cents per ton-mile. In Germany the ton-mile varies, but is everywhere low; about Frankfort it is equivalent to 10 cents in hauls of 12 miles. In the district of Hanover, for ten-mile distances the rate is  $4\frac{1}{6}$  cents, and about Munich 5 to 7 cents.

In Switzerland, Canton of St. Gall, a double team draws 30 to 40 hundredweight on hilly roads and 50 to 60 hundredweight on level roads. In France, commercial agency of Roubaix, the cost per ton-mile is a little under 12 cents.

We need not wonder, then, at the expenditure by England and Wales of \$20,000,000 annually upon their roads; nor can we count it other than the highest economy that France expends each year \$37,500,000 for the same purpose.

The average cost per ton-mile of freight carriage upon good roads of broken stone is about 8 cents, which, taken with figures already given, proclaims to the farmer that if he can get a good road he will save seventeen cents every time he draws a ton of wood, wheat, or potatoes a distance of one mile. Upon the improved roads of New Jersey one team hauls four to five tons, as against a bad-road load of one ton. At \$3.00 per day for man and team this means a saving of \$9.00 to \$12.00 for a ten-mile haul of such an amount of freight. The estimate of saving for the State of New York falls into line with those of Maryland and North Carolina, the figure being \$7,000,000 to \$10,000,000 per year. Good roads would enable some comparatively long-distance hauling to be made by team—an important consideration in case of perishable produce and household furniture, where much deterioration could be saved by avoiding railway transit. Thus on the good roads of Belgium wagons carry freight 60 to 70 miles, between Liège and Brussels or Antwerp.

The elements of loss arising from bad roads are many. We

must count in the time of men and draft-animals; the extra number of such animals employed where much teaming is required; the exposure and extra hardship to which men and beasts are subject; and the heavy strain and effective destruction of finish by which vehicles and harnesses are affected. The farmer is also restricted in the times in which he can go to market. If high prices happen to coincide with deep mud, he cannot avail himself of the golden moment. A Maryland farmer reports that he could not have marketed his wheat the previous season, from February to April, if the price had been \$2.00 a bushel. Another lost his whole crop of corn because he could not carry it to a proper place of storage. In France it is customary to use the cold or stormy days for hauling to market. But the American farmer must use for hauling the very days that are most valuable for work on the farm. No words can set forth all the elements or bring out all the meaning of the "mud tax."

It is unquestioned that good roads bring marked appreciation in the value of farm lands. In Union County, New Jersey, it is affirmed that the rise in values has more than equalled the cost of the roads. Similar improvement of conditions in parts of Indiana gives \$6.48 per acre as the rise of the selling price of farm lands. Much higher estimates have been given for some places, as \$20 to \$30 per acre about Canandaigua, N. Y. In brief, if a farm neighbourhood is reached by a good road, a heavy tax is lifted from each bushel of produce, and the region itself becomes a desirable place to live, and prospective buyers are as willing to pay for these benefits as for rich soils, heavy timber, good fences, and unfailling springs of water.

Moreover, the farmers are often able to receive a daily paper regularly through free delivery, and they thus get prompt information of the state of the market, and are not left to tardy rumour or the representations of commission agents.

Good roads bring large gains, which cannot be reckoned in money. As the older States have become great and the people have gathered in cities, enjoying the conveniences of urban life, life in the country has seemed isolated and barren. The rural regions have been in some measure depopulated in favour of the towns and great cities. The first factor in checking the rush from the country on the part of youth and progressive spirits must be the good road.

The county in which the writer lives has but three or four municipalities which exceed or approximate a population of 2,000. The

total population of the county in 1890 was 40,545. From 1890 to 1900 the loss was 2,347. The lands of the county are fairly adapted to agriculture and the building of comfortable homes, and even the more remote are within 40 miles of cities. In seeking the cause of this inability of a fertile region to hold its own in the number of its people, we cannot go far wrong if we turn to the heavy grades, deep muds, ruts, and stones of the dirt roads. Twenty-two counties of the Empire State show a loss of 30,266 in that decade, or more than  $3\frac{1}{2}$  per cent. of their total population. This decline is true of some rural counties near the city of New York, and bad roads seem to be at least an important reason why the "commuters" have shunned the otherwise accessible parts of the home State in favour of the adjacent sections of New Jersey and Connecticut.

If the farmer and his wife, or particularly his sons and daughters, can finish their toilsome day and easily visit their neighbours three miles away in the evening, or enjoy the opportunities of the town, they will think better of rural life, and cease to rob the farm of its more intelligent and more ambitious men and women. In no way is the separateness of country life more relieved by good roads than by regulating attendance upon schools. In not a few road conventions the schoolmaster has borne strong testimony to the improvement in education that must result from good roads. It means regular attendance of thousands of youth, and it also is the indispensable preliminary to the consolidation of rural schools. This means better-paid and better-qualified teachers, better equipment, the pride and momentum of numbers—indeed, all the elements that unite in a school of power. No less will religion and morals be favoured and social life advanced where church attendance is not checked by every storm and the habit of making Sunday a higher and separate day thus destroyed. The duties of citizenship will be better performed, and no longer will a rainy election day prevent a reasonably full expression of the political convictions of the rural voter. And he will be far more sure to have convictions which are worth recording in a ballot, for with good roads will come, in the end, the daily paper, the telephone, the habit of alert thinking, and prompt and forcible action. It is not claimed that good roads alone will reform society, but that they count large in the chain of forces that is lifting country life to higher conditions.

There is yet another factor which tells both in point of money and of social life. The city as well as the country is rightly coming to be taxed for the rural road. The city man and the city family find that they must seek the country, for short visits, for

long vacations, or for permanent suburban homes. No rural region can attract the urban man and his money which compels him to walk or drive his horse or propel his automobile through seas of mud. For a long period the Swiss Government lost money upon the diligences which carried passengers over its post roads. Whether this is still true the writer does not know. At any rate it made no difference with the official policy, for what the public treasury lost the private pockets of the Swiss people gained many times over from the spendings of tourists. This increased their resources, increased their ability to pay taxes, and the Government was, after all, no loser by its policy.

Such are some of the reasons why our roads should be made roads indeed rather than toilsome trails of sand and mud; and in view of the facts, which are simple and easy to understand, it almost surpasses belief that a progressive people should have ignored their opportunities for almost a hundred years. In 1893 a law was enacted which again made the National Government a promoter of improved highways. By this law the Office of Public Road Inquiries was created as a part of the Department of Agriculture. It was not established to become an actual maker of roads, but rather as a medium for information, advice, and supervision. The office gathers data from all sources, home and foreign, reviews and disseminates a knowledge of important features of State legislation, and studies the method and cost of construction. It maintains a laboratory in Washington, in which road materials are subjected to physical and chemical tests, and any locality can have samples of home materials thus examined without cost. While the Office does not engage formally in road-making, it has, for education, built short sections of object-lesson roads in 22 States, but always on the invitation of local authorities. It has thus become a kind of clearing-house for our national interest in roads, not failing to reach out in every open direction to quicken interest and impart technical knowledge. It has received only modest appropriations from the national treasury, beginning with \$8,000 per year, rising to \$30,000 in 1902, and to \$35,000 as the grant of the next succeeding Congress. It has published a series of bulletins and circulars, which are made freely available to all who can make good use of them.

The policy of Federal aid has strong advocates both in and out of Congress, and this sentiment has crystallized in the well-known Latimer-Brownlow Bill, which is now in the hands of the Senate Committee on Agriculture, and which, it is expected, will be reported favourably in December, 1904. It is strongly favoured by the

Grange and by many road organizations, and provides for a proportionate division of \$24,000,000 among the States, to be expended at the rate of \$8,000,000 per year for three years. In order to enjoy this aid each State must duplicate the sum to be received from the Government. It seems to be well claimed that this is as proper a use of Government money as the improvement of rivers and harbours, the aid of railways, or the building of roadways through the national parks.

Among the powerful agencies is the National Good Roads Association, having its headquarters at St. Louis. This grew out of a number of preliminary movements, and was finally organized in Chicago in 1900, when delegates were gathered representing thirty-one States. Many great conventions have been held, the good roads trains have been organized, the Association has worked in close relation with the Office of Public Road Inquiries on the one hand and the American people on the other, and it has thus come to represent largely the sentiment and will of the people. Many large conventions—as at Ormond-Daytona, Florida, and at New Orleans—have been held during the past twelve months. A committee of the Association secured, through President McKinley, the first presentation of this subject in Congress since the early days of the last century.

Many interests have given the good roads movement momentum. Perhaps the wide adoption of the bicycle ten or fifteen years ago did more than anything else to agitate and to bring about action. Every man who used a wheel became, without planning it and before he was aware of it, an advocate of good roads. Then first did he know how bad the roads had been. The League of American Wheelmen, with its branches in every State, organized and directed to the same end the sentiments of its tens of thousands of members. Of late the automobile has been wielding a similar power. The costly breakdowns of expensive machines and the delays and discomforts of people bent upon pleasure have created more appreciation of good country roads than any amount of indoor advocacy.

More powerful than these factors, when we reckon in the coming years, appears to be the Rural Free Delivery of Mails. The growth of this department of national postal work has been prodigious. In 1896 Congress voted a paltry \$10,000 for it. But it gave opportunity to test the new proposition. The country dwellers took hold of it. Slow in some things they may be, but they have not been slow in this. Now many millions of dollars are freely

voted, and the new service reaches daily several millions of our citizens. It is no longer an experiment. It means more money for postage, more letters written, more papers taken, swifter intelligence of friends or business—in fact, almost a revolution in the conditions of country life. But the Post Office Department is exacting. It will not send its carriers through sloughs of mud or along rough and stony roads or tearing through unopened masses of snow. There must be a road, reasonably good, and there must be bridges, passable in all seasons, and as readily after prolonged storms as in the finest weather. Tens of thousands of dollars have been spent on the highways at the direct instance of the Post Office Department. As long ago as 1902 one hundred fords had been bridged in the State of Texas for this reason; old roads had been improved and new lines of road created. In the western division of rural service one-fourth of all the routes favourably reported were to have improved roads as a result of the new enterprise. In several Southern States applications have been rejected because the roads were impracticable for a regular and comfortable service. In some cases it has been necessary to threaten discontinuance of the delivery service unless the roads were improved, and results have been forthcoming. Thus public policy and private interest conspire to the great end.

The railways have abiding reasons for wanting good country roads. Every railway line offers a channel of outflow for the products of a belt of farm lands on either side. These lands have access to the iron roads by the common highway. If the farmer can reach the market at the railway station from distances limited to eight to ten miles, the railway taps a belt of country sixteen to twenty miles wide: double the distance for the haul that can be made with a profit remaining, and the belt becomes thirty to forty miles wide. The farmer will plant more acres, ship more bulky produce, have more money, order more goods by express, take more railway journeys—in short, the railway serves a rich region instead of a poor one.

Officials of the Mobile and Ohio Railroad state that in February, 1898, their receipts were 65 per cent. lower than for the same month in 1897, and 80 per cent. lower than in February, 1896, on account of severe weather and bad country roads. The opinion is held that, with good roads, many railways could dispense with one-third of their rolling stock, because of the regularity in receiving freight throughout the year, and because it would usually be possible to haul loaded cars in both directions.

Great lines of railway have shown their interest in practical and substantial ways, and most conspicuously by bearing the expense of sending good roads trains over their lines and maintaining them for several months at a time. With these trains will be found experts from the Office of Public Road Inquiries, officials of the National Good Roads Association and of the railways themselves. They carry an outfit of road-making machinery, which is sent for free use by manufacturing concerns which appreciate the gains of so good an opportunity to exhibit their wares. It has been suggested that cement-makers be invited to take part and show what they can do in making sample culverts and bridges. The train visits localities in succession, stopping at each for several days. The locality furnishes the material and feeds and lodges the workmen. A considerable fraction of a mile of object-lesson road usually results from the visit. At the same time a convention is commonly held, which has often been heralded by emphatic messages from the Governors of States, and is addressed by members of legislatures and of the National Congress, by road experts, local road officials, by teachers, farmers, and progressive men of many occupations. The National Good Roads Convention held in St. Louis in April, 1903, was addressed by Senators from Tennessee and South Carolina, by General Nelson A. Miles, and President Jesse of the University of Missouri, by Hon. Wm. J. Bryan, by the Governors of Texas and Iowa, and by the President of the United States. This meeting was not held in connection with the migration of a good roads train, but is fairly representative of the breadth and strong interest of many such conventions.

About four years ago the President of the National Good Roads Association asked the Illinois Central Railway to send out a train at a cost of \$40,000 to \$50,000. The president of the railway said: "That is a large amount to throw in the mud, but we will consider it." They considered it and they did it, and the result was a chain of road conventions and sample roads from Chicago to New Orleans, uniting in a great industrial and social enterprise the men of North and South. Trains have since been sent out by the Lake Shore, Great Northern, Southern, and other railways. The train of the Southern Railway system left Alexandria, Virginia, October 29, 1901, and was at work, the Christmas holidays excepted, until the following April. Nearly fifteen miles of road were built, in six States, and eighteen conventions were held, of which five were State conventions. When we observe that the Alabama conventions were held and sample roads built at Birming-

ham, Montgomery, and Mobile, while in Virginia the chosen points were Danville, Lynchburg, Charlottesville, and Richmond, we sufficiently show the influence likely to be exerted over the whole of these great States.

The possibility of employing convict labour has been a considerable factor in road development, especially in the Southern States. In those States, in the year 1900, 4,377 convicts were employed in building public highways. It is urged that during the same period 7,000 men were confined in county jails in that part of the Union who might better have been building highways for the use and advantage of citizens than living in idleness at a heavy cost to the public.

Professor Holmes, speaking for North Carolina, says that experience has been favourable to this system of convict employment, both in its efficiency and in respect of the health of the man. Certain inducements were offered, such as a reward or a shortening of terms, for those who were faithful. After trial of a year no attempts to escape had been made, and the prisoners had been kept at a less cost than when in ordinary confinement. Prisoners guilty of murder, rape, and arson were made an exception in the matter of road service, and were held behind prison walls.

The road law of Delaware, passed in 1893, provides for the purchase of a quarry where stone shall be broken for roads by convict labour. The general policy is opposed by the Prison Association of New York because of interference with free labour, danger of escapes, and the demoralization through much publicity both of the prisoners and the people at large. On the other hand, it is urged that able-bodied men are rewarded for crime by being supported in idleness and that factory labour in prisons is indeed hostile to free labour. The out-of-door exercise is good for the men, and the sight of them is claimed rather to be a deterrent from crime. It is urged that in the South the transfer from a system of contracts made with irresponsible and often cruel private parties to the humane care of public authorities would be a kindness to the convicted criminal. The middle ground is also taken that machinery will largely do away with hand labour in actual road-making; hence it is proposed to concentrate convicts at quarries, in the preparation of materials to be shipped by railways under permanent contracts, to the points where the material is needed. This would involve the erection of prison buildings at such locations of quarries.

Warden Grimes, of New Jersey, favours the use of convicts, and

thinks it will stop the labour agitation against prison manufactures. He also affirms that the condition of the men has improved under the system. In California, by a law of 1895, it was decided to employ convicts in public work which, on account of its cost, would not otherwise be undertaken. A rock-crushing plant was put in at Folsom, where the material for roads is good, and this material has been sold at prices of 25 to 30 cents per ton, and this at a profit to the State. The Southern Pacific Railway Company conceded low transportation, the rate being about three-fourths of a cent per mile. This plan has promoted road-building in Stockton, Marysville, Sacramento, and other towns. In South Carolina prison vans have been used, enabling prisoners to camp where the work is done, thus reducing the cost of maintenance.

Massachusetts was one of the first States to adopt the plan of State aid and to place its roads under the control of a highway commission, one of whose three members must be a competent engineer. State aid was voted in 1892, and the eleventh annual report, of date 1904, has now appeared. These reports are valuable records of methods and progress. The State has 17,000 miles of public roads. State highways 482 miles in extent were completed by the close of 1903. The gravel roads have been built at a cost of \$1,500 to \$2,000 per mile, and the macadam roads have cost \$8,000 per mile; 646 petitions for roads have been received, contemplating the location and building of 1,663 miles of highway. The State pays three-fourths, the counties one-fourth, and maintenance is by the State.

An important law, known as the "small town" act, was passed in 1900. Since that time 255 petitions have come from 101 towns. The work consists of cutting hills to good grades, filling, and draining. The greatest gain is in the fact that this work is planned and directed by experts, but is carried out by local road officials, who thus get a most important training. "After five years of trial it can be positively stated that there is a marked improvement of the country roads throughout the Commonwealth, and that this improvement is entirely due to the so-called small town act."

New York has for several years been among the more progressive States in the improvement of highways. Under the leadership of State Engineer Edward A. Bond, Mr. William Pierrepont White of Utica and others public sentiment has been widely aroused and the needed legislation has been secured. The larger amount of State aid has been granted under what is known as the

Higbie-Armstrong Law. It is proposed to build a system of main roads, amounting to ten per cent. of all the common roads in the State. The extent of this undertaking is seen when it is understood that there are 74,097 miles of earth roads in total. The Governors of the State took up the road interests in their messages in 1890 and following years, and in 1896 and 1897 the farmers gave the subject attention in institutes held in many counties. It is computed that good roads will save \$10,000,000 per year in the preliminary haul of produce. Under the Higbie-Armstrong Act the State pays one-half the cost of improvement, the county thirty-five per cent., and the town fifteen per cent. The Legislature of 1902 appropriated \$795,000, and the amount set apart for the current year (1904) rose to \$1,108,265. This item is under the Higbie-Armstrong Act, and further appropriations for road-work bring the total for 1904 to \$1,500,000. As a result nearly 500 miles of main road will have been finished by the close of this year, and the counties have provided their share for 767 miles more, which will be built as soon as State funds are available. A large convention of the supervisors of towns from most of the counties is annually held in Albany; and the sentiment of the people is thus organized and brought to bear on the legislative and the executive authorities. There is a strong movement to raise \$50,000,000 by bonding, that the benefits of the ten per cent. of trunk roads may not be lost to the present generation. It is urged with much force that this is as reasonable as to raise \$100,000,000 by this means for the Erie Canal when a large proportion of the farmers are in no way benefited by that waterway.

Under the old plan 2,000,000 days of labour were supposed to be expended on the roads each year, an outlay purporting to amount to \$3,000,000. There was little but mud and dust to show for this, and yet for many years these conditions aroused surprisingly little criticism. The law for the benefit of main roads has now been supplemented by the Fuller Law, by which the counties may adopt a money system and receive fifty per cent. of State aid for the improvement of the side-lines of road, thus giving the rural residents everywhere an equitable share of improvements. This in its results is somewhat like the small town act in Massachusetts, and 358 towns in New York have taken advantage of it during the year 1904. Hon. Martin Dodge, director of the office of Public Road Inquiries, affirmed in April, 1903, that in New York more permanent improvements in the highways had been made in two years under State-aid laws than had been made in two hundred

years before. The State Supervisors, also, are in favour of the system of county engineers, of the adoption of a wide-tire law, and of the enactment of the Brownlow Bill by the National Government.

The work is in an advanced state in New Jersey, where, in 1901, 1,000 miles of road had been built under the State-aid plan. The construction of stone roads began in 1891, and State aid was voted in 1893. It is said that 100 to 125 baskets of produce now make an ordinary load where before 25 baskets formed the average; and it is believed that the sum of \$27,000,000 has been added to agricultural values in the State.

There has been a great awakening in the South, as has been hinted in our notice of the good roads train of the Southern Railway. No State has been more active in these improvements than North Carolina. Mecklenburg County is one of the progressive centres of the work, and this single county had in 1901 one hundred miles of stone road, and five to ten miles of new road were being added each year. The interested reader is referred to a vivacious account of the road movement about Charlotte, in this county, in an address by Captain S. B. Alexander, found in Bulletin 24, Office of Public Road Inquiries.

Reference has been made to work in a few of the older States, but the reader is not to suppose that the new interest in roads is circumscribed or local. It is as nearly non-sectional, non-political, and universal as any movement in recent years. Pennsylvania has set apart \$6,500,000 to be expended upon her roads during the next six years. Illinois has appointed a good roads commission, with a view to amending the road laws. Alabama is among the more progressive Southern States in providing for special taxes and permitting the issue of bonds. The reader will find a review of recent road legislation in 26 States in the year-book of the Department of Agriculture for 1903 and in recent publications of the National Good Roads Association.

Few economic and social problems are so important as this, and in few is the way so fully open for solution in the immediate future. Nearly every region has suitable road materials, as at Mobile, where the people of the Southern Railway Good Roads Train built a sample road of oyster-shells covered with gravel. The Office of Public Road Inquiries often finds that materials are brought from a distance through ignorance of those which, as good or better, lie unused but near at hand.

The present waste is inexcusable in view of present experience.

The millions now sunk in mud-holes can swiftly, by new methods, be turned into profitable channels. Not every county pathmaster can receive an engineer's training, but the principal highways can be constructed by engineers, and the less-used feeders can receive oversight, as in Massachusetts and as contemplated by the county engineer system in New York. The technical requirements will be met and the money will be at hand when the majority of the rural people know a good road and demand its advantages. If the technical schools which we have cannot provide the necessary training, we may develop somewhere in this country a school similar to the French National School of Bridges and Highways.

Mr. D. R. Francis, of the Louisiana Purchase Exposition, recalls the time when the courts had to compel abutting property to pay paving assessments in cities; and he urges that to raise \$3,000,000 a year in Missouri would only require a tax of 25 cents on each \$100, which would probably add \$5 per acre to the land values of the State. The burden should fall, as it is falling, upon city and country alike, for every citizen harvests the blessings of improved highways.

With road-building will go a good measure of re-location in all regions of much relief, correcting, so far as possible, the mistakes of the pioneers. A recent survey has shown that a road can be carried up the rugged slopes of Grandfather Mountain in the Appalachians of North Carolina with a maximum grade of 5 per cent. The "hill tax" of Professor Holmes will be reduced as the farmer and tourist are lifted out of the slough and sent on their way rejoicing. Not much longer will the careless farmer or manufacturer be allowed to plough the roads, old or new, when a wide tire becomes a road-maker rather than a road-wrecker. It is no new idea; for the wide-tired wheel was urged by Albert Gallatin in the road-making days of long ago, and effective enactments are sure to follow the building of costly roads. If America be the most progressive nation in the world, her citizens will not much longer endure medieval discomforts when they go out to mingle with their fellows and market the fruits of their fields.

## AN EXPEDITION TO TRIPOLI.

BY THE

VICOMTE DE MATHUISIEULX.

For thirty years past scientific and military expeditions have been multiplied in northern Africa, and investigations of all kinds have gone beyond the territories inhabited by the Arabs and the Berbers into the Sahara. In this way Egypt, Tunisia, Algeria, and even Morocco, have revealed their important secrets of ancient and modern geography; but the Turkish colony of Tripoli has remained unexplored because the Sublime Porte absolutely forbids its entrance to strangers.

This regrettable void moved me, three years ago, to overcome all the obstacles in the way of furnishing to science the first collection of data on this hidden region. Thanks to a happy concurrence of circumstances, I succeeded in making a methodical exploration of all Tripoli, properly so called, between the Tunisian frontier and the gulf of the Great Syrtis and the administrative boundaries of Fezzan.

I made my third journey last April. With a small party, a few soldiers for escort and a caravan of camels, I left the port of Tripoli to follow the shore to the eastward of that city as far as Khoms.

I already knew this Tripolitan shore, which I had travelled from Tunisia to the Great Syrtis. Its low dunes continue almost without a break, and extend under the sea with a slope so gradual that ships must keep far offshore in order to avoid the submarine shoals. There is no shelter for shipping except the road of Tripoli, and this road itself is so bad that even a slight storm makes entrance impossible. It is not unusual for the weekly steamers from France and Italy to pass the roadstead without disembarking passengers or merchandise. Quite lately the English Consul-General, returning from a leave of absence, found himself obliged to put to sea again for fifteen days, though he had come so near as to see the terrace of his residence.

The only two ports on this coast are Tripoli and Khoms, and the latter is frequented only by small English steamers, which load with *halfa* for the London paper mills. The new anchorage of Misrata,

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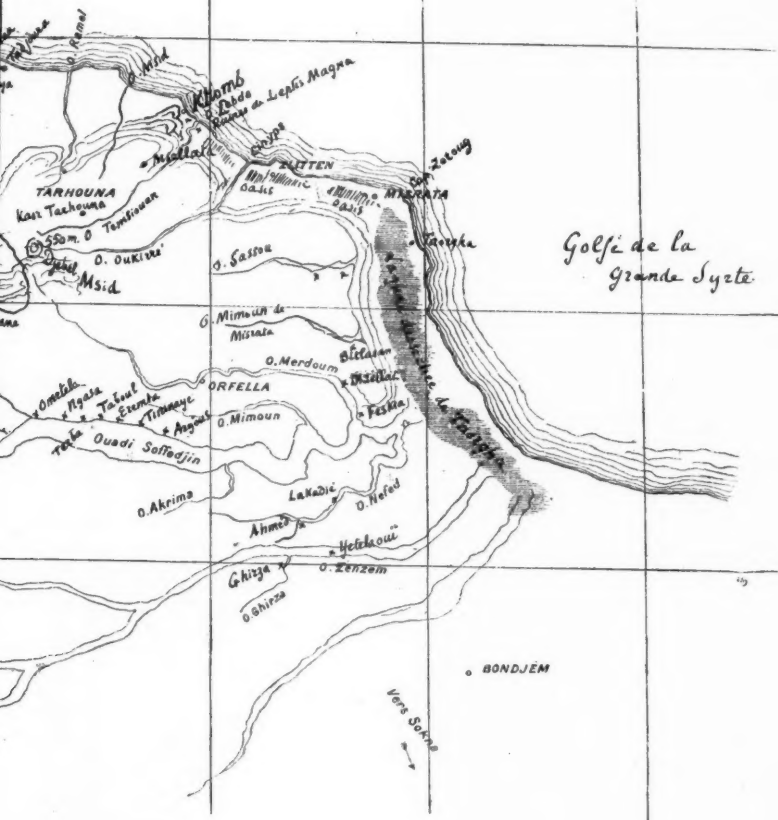
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OF THE AUTHOR'S MAP.

DIAN OF PARIS, 2° 20' 15" EAST OF GREENWICH.



at the eastern extremity of the *vilayet*, is only a stopping-place for the Italian Maritime Company, for the service of the town, situated two and a half miles from the sea. The seashore of Tripoli may be called a solitude. Formerly it was not so; we learn from Homer that the companions of Ulysses were hospitably received there by the celebrated lotos-eaters. Strabo relates that it was a resort for fishermen, who caught the fish on the fly or by running along the low beach as the tide went out. But other proofs of the ancient prosperity of these shores exist in great number in the remains of Punic and Roman cities. The three principal towns which gave the name of Tripolis to all this part of Africa were: Oea, on the site of the modern Tripoli; Sabratha, fifty miles to the west; and Leptis Magna, fifty miles to the east. A number of secondary ports were intermediate among these three emporia. It is probable that these ports were established by the Phœnicians of Sidon, for it was they who first visited this coast to trade with the tribes of the Fezzan; but we shall not be able to speak with certainty on this point until the Turkish Government withdraws its prohibition against excavations. At present we can only distinguish the superstructures, which all belong to the epoch of imperial Rome. Nevertheless, it may be affirmed that the Tripolitan emporia were of considerable importance. The remains of Oea are not to be seen, because the City of Tripoli covers them with its houses; but at Sabratha and Leptis there rise superb temples, stadia, and enormous amphitheatres, the whole surrounded with vast enclosures. At Gargareeh, near Tripoli, a tomb recently uncovered has made it clear to scholars that women were admitted into the sect of Mithra—a fact previously unknown. At many other points we find the towers used by the ancients as telegraphic stations, from which they transmitted news in a single night from Egypt to Morocco.

A line of dunes between fifteen and thirty feet in height follows the Tripolitan seashore almost continuously. Where these dunes are interrupted the sea invades the plain, or *Djeffara*, which is lower than the sea-level. In this way there are formed *Sebkhas*, or natural salt marshes, like those of Brega, of Tader, and Macta, at the western extremity, and that of Melaa, east of Tripoli.

Two or three miles behind this line of dunes runs a succession of maritime oases, frequently interrupted. These oases are rich in palm trees, but their very narrow breadth forms hardly a thousandth part of the desert, sandy plain which extends between the sea and the high interior plateau, over a mean breadth of sixty miles. The oasis of Zouara, formerly celebrated for the excel-

lence of its water and the perfidy of its inhabitants, who were dreaded by the Venetian mariners, is now no more than a grove, which shelters the Turkish garrison at the Tunisian frontier. Abou-Adjlat is the largest of these garden spots west of Tripoli. Then come Sabua, Zavia, Djedjaim, Mayat, Sayat, and Zenzour, reduced now to the mere local supply, but in ancient times frequented by the rich Romans, who there built sumptuous villas. The name of Meschya is given to the immense palm forest which surrounds Tripoli "like a collar of emeralds," and reaches as far as Tadjoura. From Tadjoura to Khoms the gardens disappear, to begin again in the neighbourhood of Lebda (Leptis Magna), and continue without interruption as far as Cape Zoroug, under the names of Zlitten and Misrata. The Arabs of Zlitten enjoy such a bad reputation that their co-religionists hardly dare to cross their territory; and, unlike all the other centres of the *vilayet*, no Jews are to be found in this—it is said, because the Zlittians have killed them all. On the other hand, the natives of Misrata are affable and friendly toward other tribes, and no one can explain the reason of this difference of character between men of the same race and civilization.

At a single point of the coast the hills rise above the sea; this is in the environs of Khoms, where the little plateau of Tarhouna throws out a spur, channelled by the ancient waters.

Geographers have erred in tracing water-courses in the plain, or *Djeffara*, and flowing into the sea. In the western part no one of the streams of the interior plateau goes beyond the foot of the great cliff, where they spread out on the sand and create a zone for the culture of grain. It is only in the eastern part of the country, where the plain is narrowed by the terrace of Tarhouna, that some *wadys* contribute in an intermittent way their thread of water to the Mediterranean; such are the Ramel, the Msid, the Lebda, the Cinyps.

In my two previous journeys I had explored all the *Djeffara* and the interior plateau. I had yet to study the terrace of Tarhouna, and find in what way it was connected with the high central land. From Khoms I took the route towards *Gariana via Msellata*. The Tarhounian plateau, which is intermediate between the coast and the Djebel, 2,000 feet high, measures, on the average, only 1,000 feet. It descends from the southwest to the northeast in such a way that where it joins the Djebel it is more than 1,300 feet high, while the last hills on the sea measure hardly three hundred. From this conformation it results that the *wadys* Temsiouan and

Oukirre, which we identified with the mouths of the Lebda and the Cinyps, are perfectly dry and without banks, like ribbons of verdure; while the wady Ramel and the Msid, cutting an abnormal ravine for themselves, have ploughed the soil very deep.

The Tarhouna is continued by calcareous rocks, like all the other Tripolitan elevated land; but there is a very great number of basaltic columns, which pierce the generally level surface with bristling cones. In the vertical sections of the wadys are frequently found basaltic pillars, their black line marking itself on the white surfaces like so many sheaves, spreading widely open at the upper part. I remarked that the projecting rocks assumed the pointed form wherever they were due to the basaltic flow, while their summits were harmoniously rounded when they resulted from erosion.

The Tarhouna was densely peopled in antiquity. The innumerable vestiges of Roman settlements show that the ancients cultivated the olive to a great extent. We found everywhere the remains of curious oil presses, which Barth believed to be altars for human sacrifice. Every settlement possessed several of these *torculars*, which, strangely enough, are the only monuments left standing among the ruins of dwellings, though their elevated shape should seem to have marked them for destruction.

To-day the Tarhouna is almost a desert. Apart from the grain fields of Msellata, of the Kasr Tarhouna, and a few other localities, we meet no sign of life but a few wandering Arabs. For a few years past these shepherds have taken up a new industry; they gather the natural yield of the halfa and take it to the seashore, where it is exported for the paper factory. They overload their camels with twice the ordinary burden of three hundred pounds.

How does it happen that the olive trees, once so abundant, as attested by the remains of the presses, have all disappeared? I think this must be laid to the charge of the Arab invasion, which destroyed or neglected the trees, the Arabs devoting themselves only to the raising of sheep.

In the very centre of the plateau of Tarhouna I had the good fortune to discover a Neo-Punic inscription, the only one which possesses a precise date, and consequently an historical document of great value.

The highest point of the plateau is the Msid, which rises to 1,800 feet. From the summit we embrace all the region bounded by the Djebels, Djemma, Magra, Chaïet, and Hammass on the east; while on the west opens, like a great cleft, the valley of wady Rhane,

marking the separation from the great central plateau. Beyond the wady Rhane, in fact, we come to the high lands or T'ahar. Up to the present time these high lands were regarded as mountains, but they really form a plateau, with a mean altitude of 2,000 feet in the northern part, and sinking gradually towards the stony Sahara, or Hammada. The mistake was natural; the plateau ends abruptly on the north, where it plunges down on the Djeffara by a cliff, which runs through the whole width of the vilayet parallel to the sea. The Djeffara plain, which rises from the sea perceptibly towards the south, has an elevation of 1,000 feet at the point where it joins the foot of the great cliff. The immense front or northern trench of the plateau (a vertical wall of 1,000 feet) is remarkable for the horizontal lines which stripe it like the lines on a sheet of music paper. These lines are the vertical section of the alternate superimposed strata of gypsum and limestone.

This rampart has not remained solid in every part. It has been broken down at various points by the waters after they have cut into the edge of the plateau along a zone of eight or nine miles. This zone forms a picturesque tangle of deep ravines and gorges, of pillars and needles, and overhanging masses of rock.

It is not in any way surprising that my predecessors of long ago, hastening their march towards Lake Chad or the Niger, imagined they beheld a chain of mountains in the rugged edges of the plateau, which seems to one approaching from the Djeffara like a range of the Himalaya. The natives themselves speak of Djebel Gariana, between the wady Rhane and the great gap of Kikla; Djebel Yffren and Djebel Nefousa, west of that depression.

The population here is no longer Arab; it is composed of Berbers of the purest type. In the Gariana and in certain districts of the Nefousa, as at Nalout, these mountaineers live like troglodytes, in subterranean abodes identical with those described by Herodotus. On the front of the *massif* the excavations are cut in the vertical walls of the gorges; on the plateau they are opened at the bottoms of great square wells, dug in the horizontal surface. In these latter, which are so many deep precipices open to the sky, the approach is by a narrow, winding passage, of which the upper entrance is concealed by plants and shrubs at a little distance from the edge of the well. The path is not wide enough for two men abreast, and the slope is so steep that one descends faster than he wishes. Notwithstanding the narrowness of the path, the animals, including even the camels, find their way to the underground stables.

In some localities these cave-houses are the only habitations to

be met with, and it is easy to understand that in a land swept by continual high winds, with torrid heat by day and very cold nights, the natives prefer a shelter with an even temperature and proof against the violence of the wind.

At Zentan the troglodyte population is largely Jewish. These people claim descent from Israelites who emigrated to this spot immediately after the return from the Babylonian Captivity; but there is no historical evidence for the assertion, and it is a fact that for centuries the Zentan Jews have held no communication with those of Tripoli.

The Berbers of the Djebels, easily distinguished from the Arabs by their square heads and their more powerful forms, are still more unlike the Arabs in character and manners.

The Arab wave beat in vain against the boundary of the plateau, which has been truly defined by a geographer as the real continental shore of this part of Africa. The Berbers successfully repelled the conquerors, and it was only after sanguinary wars that the Turks overcame these mountaineers armed with flint muskets.

The Berbers have never admitted a marriage with the Arabs. Frank and brave, they preserve their love of independence and the hope of one day regaining it from the Turks; and the Porte, well aware of this disposition, keeps a strict watch upon them. When they gather about their fires in the night they recount the exploits of their ancestors and sing patriotic songs. Their dwellings are so many eagles' nests in the gorges and on the isolated peaks. At Nalout, at Mamout, at Kabao, the villages are perched on the sides of rocks overhanging deep clefts. These rocks terminate in fantastic battlements cut in the mountain without any masonwork. The interior passages of these aerial citadels are so narrow and deep that the rays of the sun never reach the bottom. The walls look like pigeon-houses, pierced as they are at regular intervals with holes, the openings of the store-rooms in which each family keeps its provisions, as in a time of invasion.

These Nefousan Berbers are Mussulmans of a special sect, closely affiliated to those of the M'zab of Algeria, the head of which resides, it is said, in Arabia, in Oman. It seems certain that the Nefousans formerly belonged to the Christian communion, to judge from the numerous traces of Byzantine convents and the details of some of their legends.

Industrious and hard-working, the Berbers cultivate the northern border of the plateau, the only inhabited and habitable part of this region. The smallest bit of ground in the ravines is turned

to account for the production of barley, by an ingenious system of sustaining walls. Behind all these ravines, where the valleys melt into the broad surface, the olive plantations are in full vigour, as at Djado, at Zentan, and at Yffren. The irrigating methods here employed might be taken for those of our own engineers. Djado has been and still is the great religious and intellectual centre of the Nefousa.

Yffren (called the Castle of the Mountain) was the military centre, but the Berber stronghold was destroyed by the Turks when they succeeded in putting down the last revolt of the celebrated Rouma in 1850.

In general, the chief towns of districts—Gariana, Kikla, Yffren, Djado, Zentan, Nalout—are built on the great gaps through which the caravans pass to climb the plateau. The mountaineers held these places to defend the approaches to their homes; the Turks have fortified them, in their turn, to keep control of their unruly subjects.

From Gariana I made my way to Mizda, on the wady Soffedjin, in order to follow up to its source this great transverse gorge of Tripoli, which, in a previous journey, I had descended to the sea; so that I have traversed the whole interior plateau known as T'ahar.

This plateau, as I have said, slopes gently towards the south, and merges without any transition into the Hammada, which is at the same elevation as the point where the Djeffara joins the great northern cliff. The northern slope is consequently very rapid, since it consists only of the narrow, indented zone already mentioned. It was on the crest of this zone that the Romans constructed the series of stations along the plateau, their *Limes Tripolitanus*. The ruins of Tramzin, of Slammat, of Zentan, of Yffren, and Djendouba are the vestiges of the *Limes* which I have been able to identify. These stations served at the same time as quarters for the garrisons and as a protection to the colonists, and they extended from Talapé (Gabes) to Leptis Magna (Lebda).

Besides its descent towards the south, the plateau inclines to the east, and the *wadys* follow this direction and terminate in the Great Syrtis. The principal wady is the Soffedjin, which crosses solitudes visited only by a few wandering Arabs, the Berbers not being met with again till Rhadames is reached.

The name of the Soffedjin seems to be derived from the snakes which abound in it (*Soff ed Djinn*, Valley of Devils).

Above Mizda there are but few traces of Roman occupation, only here and there a post on the line of routes to the interior, as

at Djendouba, Skiffa, Ragda, Ouamès, and Ogla. At present all this region is infested by the Touareg, who have been driven out from the French Sahara; and it is a wonder that we passed through their encampments without harm.

Mizda, which appears, from its prominence on the maps, to be a great centre, is, in fact, a miserable hamlet, in which a few fanatical Senoussi make a bare subsistence from their two hundred palm-trees. The two tribes inhabiting this hermitage were formerly engaged in constant wars with each other, and the two parts of the town bristle with rude forts, in which the combatants took shelter when defeated. Peace has prevailed since the Turks established a permanent garrison.

Beyond Mizda the Soffedjin and its affluents, and the other tributaries of the Great Syrtis (all of them dry beds, except when a storm pours down for a few hours), are bordered with remains of forts and fortified farms and tombs, in very great numbers. The colonization was so thorough up to the lagoon of Taourgha (now entirely dry) that the establishments almost touched each other.

It is in this region that the encampments are most numerous, and here the Arabs cultivate their fields of barley along narrow strips of land over a surface sometimes six or eight miles in breadth. Tangible evidences of the ancient density exist at Ometela, Ngassa, Terba, Teboul, Eremta, Tinanaye, Argous, and Oteila, on the Soffedjin; at Ghirza and Yetelaoui, on the Zemzem; at Ahmed and Lakadié, on the Nefd; at Feskia and Msellat, on the Merdoum; at Bitlasan, on the Mimoum; and at other ruins on the Sassou.

In our day, therefore, as in antiquity, it is in the eastern part of Tripoli, between the Great Syrtis and the line from Gariana to Mizda, that man has tried to live on the products of the soil, by cultivating the beds of the wadys, numerous enough and broad enough to make altogether a considerable surface.

Besides these gardens in corridors there have never been more than two other zones of cultivation: the narrow line of maritime oases, with their palm trees, and the northern border of the interior plateau, with its olives. But no comparison can be made between the Roman colonization and the meagre Arab encampments which have taken its place.

The country has been ruined from top to bottom. This is probably the result of several causes simultaneously at work, as in other regions of northern Africa. I do not believe that the meteorological conditions have changed since the time of the Romans.

The Latin texts and the monuments seem, on the contrary, to

establish the fact that, so far as the atmosphere and the soil are concerned, everything remains as it was in antiquity. The present condition is due to the idleness of the Arabs and their destruction of the growths. They have allowed the innumerable wells to become choked and the vegetation to perish. In a country so little favoured by nature the first requisite is a diligent and hard-working population. The Romans took several centuries to make the land productive by damming the ravines and sinking wells in the *wady* beds. Except in some terribly stony deserts, the soil is excellent, and very fertile when supplied with water, but it receives none now that the wells are abandoned.

To recapitulate, the structure of Tripoli is simple: a stretch of seashore, then a great interior plateau, ending abruptly on the Djeffara and declining gradually to the south and the east. From the plateau a terrace, called Tarhouna, projects towards the sea. The distribution of the population is equally simple: the low lands are held by the Arabs, sedentary in the oases near the sea and nomadic everywhere else; and the indented zone of the plateau, called Djebel Gariana and Djebel Nefousa, is inhabited by Berbers of unmixed race.

Very different ideas with regard to the geography of this country existed before our expedition, and to have set the facts in a true light is sufficient reward for our efforts.

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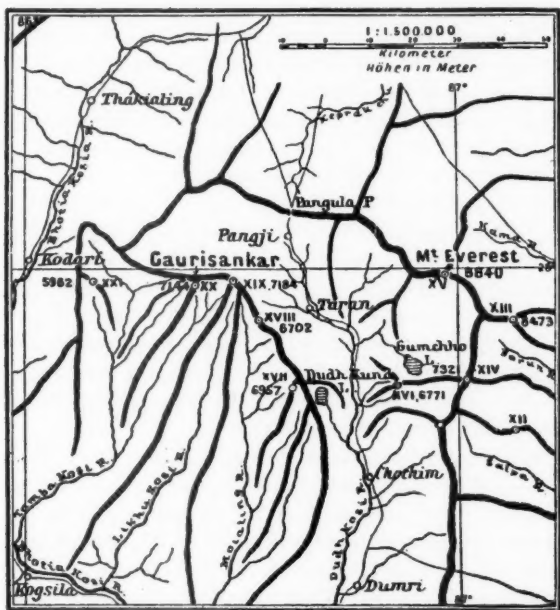
#### GAURISANKAR IS NOT MOUNT EVEREST.

In the fall of 1903 Captain H. Wood, R.E., of the Indian Survey, was sent to Nepal by Lord Curzon to ascertain whether the peak known to the Nepalese as Gaurisankar was identical or not with the peak known to us as Mount Everest. An experienced surveyor, and equipped with the best instruments and with full permission to use them, the results he obtained are of no small interest, for they end a controversy extending over nearly a half century concerning the name of the highest mountain in the world. These results of Captain Wood's visit are given in his "Report on the Identification and Nomenclature of Himalayan Peaks," recently published in Calcutta. An article based on this report is printed in *Nature* (No. 1828), from which the following facts are taken.

The chief result of Wood's visit to Kaulia, Nepal, was that he

found that Gaurisankar and Everest are different peaks, thirty-six miles apart, and that Everest, from that point of view, far from being conspicuous, is almost concealed by intervening ranges. He discovered that an imposing peak of the snowy range—a peak long known in the records of the survey as Peak XX, height 23,440 feet—is the famous Gaurisankar of the Nepalese.

This discovery proves the mistake of Schlagintweit when he asserted that Everest and Gaurisankar were one and the same mountain, and that the culminating point of the earth should be



called Mount Gaurisankar—a contention that for decades has been strongly maintained by many geographers of continental Europe.

It will be remembered that about 1852 the chief computer of the Survey Office at Calcutta informed Sir Andrew Waugh, Surveyor-General of India, that a peak designated as XV had been found to be higher than any other hitherto measured in the world. This peak had been observed from six different stations, and on no occasion had the observer suspected that he was viewing through his telescope the highest point of the earth. The mean of the six values of height obtained for Mount Everest was 29,002.3 feet.

Sir Andrew Waugh had always adhered to the rule of assigning to every geographical object its true local or native name; but here was a mountain, the highest in the world, without any local or native name that he was able to discover. He determined, therefore, to name the great snow peak after Sir George Everest, his former chief, the celebrated Indian geodesist. The name of Mount Everest has since become a household word, and no objection to it has ever been raised by natives of the country.

When Sir Andrew Waugh announced that the peak was to be named Everest, Mr. Hodgson, who had been the political officer in Nepal for many years, intimated that Sir Andrew had been mistaken, and that the mountain had a local name—viz., Devadhunga. It is now known beyond dispute that Hodgson made two mistakes. All subsequent information goes to show that there is no peak in Nepal called Devadhunga. It is believed that the name is a mythological term for the whole snowy range, and that the mountain Hodgson saw was not Everest.

In 1855 the German explorer Hermann von Schlagintweit visited a hill in Nepal named Kaulia, near Katmandu, and from it took observations of the snow peaks. He saw the mountain called Devadhunga by Hodgson, and wrongly identified it as Mount Everest. He, however, repudiated Hodgson's name of Devadhunga, and certified that the local native name for the peak was Gaurisankar. This was true, and Schlagintweit's mistake was that he supposed this mountain to be Everest.

Continental geographers, accepting Schlagintweit's views, have continued to this day to call the highest mountain in the world Gaurisankar. The Indian Survey authorities, however, were unable to reconcile Schlagintweit's views with their own, and declined to follow him.

The supposed identity of Everest and Gaurisankar rested only on Schlagintweit's evidence. It is true that successive British residents at Katmandu, the capital of Nepal, continued to regard Gaurisankar as Everest, but their ideas were based on the Schlagintweit tradition. It was left to Captain Wood to clear up the mystery. The accompanying sketch map, showing the relative positions of Mounts Everest and Gaurisankar, is from *Petermanns Mitteilungen* for November, 1904.

## THE TRANS-ANDEAN ROUTE IN PERU.

The Government of Peru has a Handbook, first issued in 1903, which it publishes in Spanish, Italian, and French, for the use of investors and immigrants. The book has been augmented and translated into English by F. A. Pezet, Secretary of the Peruvian Legation at Washington. Copies are supplied to those desiring them.

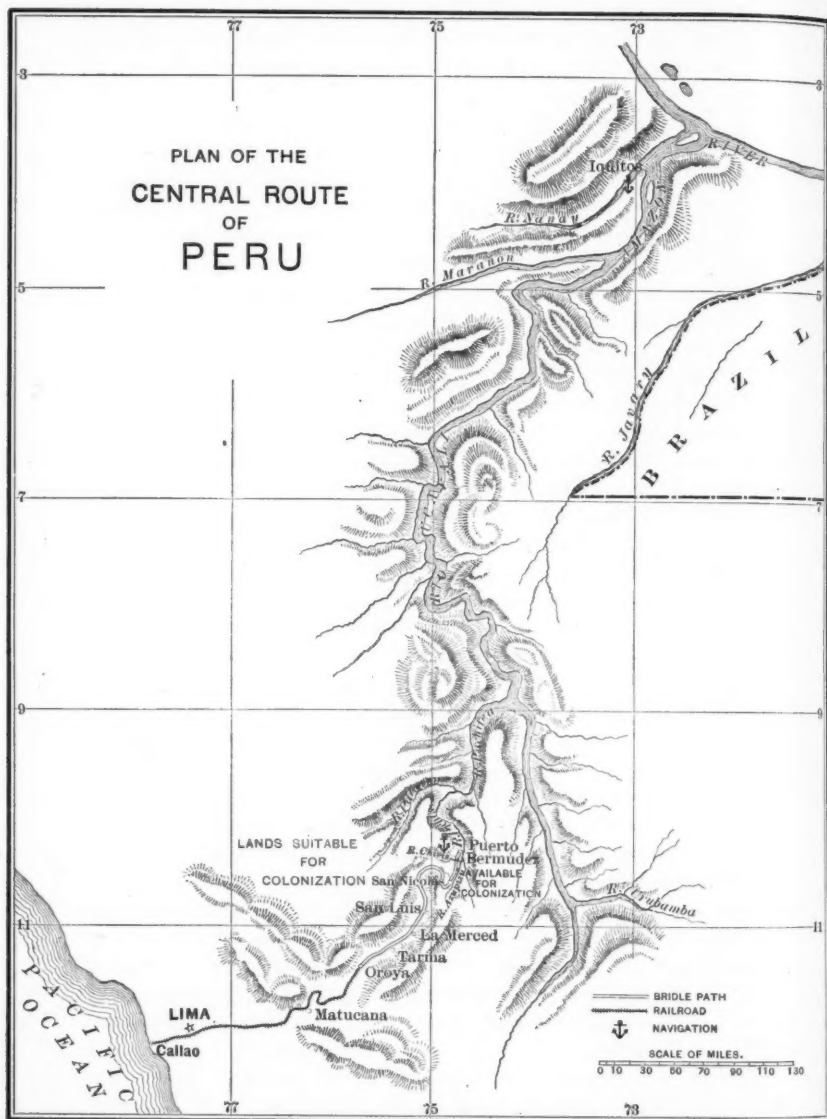
The rich valleys of the Peruvian coast, from which the greater part of the agricultural wealth of the country is now obtained, are, from north to south: Tumbes, La Chira and Piura, Lambayeque and Pacasmayo, Trujillo, Chicama, Santa, Huacho, Chancay, Lima, Cañete, Chincha, Pisco and Ica, Nazca, Camaná, Mages, Tambo, Arequipa, Moquegua, Locumba, and Tacna. All of these, and more especially Lambayeque, Chicama, Cañete, Ica, and Moquegua, offer a vast and fertile area suitable for immigration; and it has been calculated that, by increasing the agriculture and rural population, the productiveness of these valleys could be increased to eight or ten fold their present yield.

But there is another region that is believed to offer still greater advantages to immigration. This is the region crossed by the transportation route between San Luis and Iquitos, on the Atlantic slope.

Peru has completed at great expense what it calls "The Central Route of Peru," which, it is claimed, solves the problem of rapid, direct, and easy communication between the Pacific and Atlantic Oceans, and forms an outlet to both seas for the products of the three distinct zones into which the country is divided—the coast in the west, the Sierra (mountain) highlands in the centre, and the Montaña (forest) region in the east.

The accompanying map shows both this route, which completes a transcontinental route between Callao and the mouth of the Amazon, and also the situation of the land suitable for cultivation which the Peruvian Government is offering for sale to immigrants on the Atlantic slope along the route. The map is reproduced from the *Handbook*.

The Central Route includes the railroad between Callao and Oroya, a journey that occupies a day. Oroya is the terminus of the Central Railroad, and between this point and Puerto Bermudez the Government has built an excellent bridle-path. This was a



somewhat costly undertaking; for many bridges were required, and it was no easy matter to make the path perfectly safe and convenient throughout the drop from the high plateau to the river.

On this path is Tarma, a prosperous little city of over 8,000 inhabitants, very healthful, with good schools and many resources. A journey of ten or twelve hours down the path takes the traveller into the fertile Chanchamayo valley, of which La Merced is the commercial centre. Here the forest region may be said to begin. The valley stands about 3,285 feet above sea-level, and has a healthful climate. La Merced, though small, is a flourishing town. Puerto Bermudez, where the bridle-path ends, is only 273 miles from the Pacific Ocean at Callao and 136 miles from the railroad terminus at Oroya. The difference of elevation between Puerto Bermudez and Oroya is 11,466 feet, and this part of the trans-continental route thus involves the hardest travel.

The journey from Puerto Bermudez to Iquitos by the Rivers Pichis, Pachitea, and Ucayali is about 1,000 miles, which is covered in six days by the steam launches of Peru on the down trip and in from ten to twelve days on the up journey. Iquitos is in regular connection by steamship with Europe. At several points along the land route the Peruvian Government has established inns, where the wayfarer may find fairly comfortable quarters and abundant food supplies. The inns are at intervals covered by the daily journeys.

The areas marked on the map as adapted for cultivation are regarded as offering particular attraction to immigration. The natural products of the region, such as rubber, gums, resins, timber, medicinal plants, and dyewoods, offer fine opportunities, besides the cultivated crops, such as cacao, coffee, sugar-cane, and other products suited to the climate.

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#### TOPOGRAPHIC SURVEYS IN WESTERN UNITED STATES.

In the last issue a brief résumé was given of the results of the topographic work of the Eastern Division of Topography of the U. S. Geological Survey during the season of 1904. The Western Division, which operates in the arid regions, being particularly those west of the great plains, also had an active season in 1904, and mapped a considerable area. A notable fact in connection

with the recent work of the topographic mapping in the Far West is the increased demand for more detailed maps and the increasingly larger areas being mapped on scales of 1 mile to 1 inch or larger. Until about ten years ago maps made on scales of 4 miles to 1 inch and with contours of interval of 200 feet seemed ample to meet all the requirements of the geologists and engineers. Then work on the more detailed scale of 2 miles to 1 inch, with contours of interval of 50 or 100 feet, came into demand. Practically all of the geological exploratory work for the United States has now been done. The locations of the larger areas of valuable economic minerals are known in a general way. The field examinations of the geologists are, therefore, becoming restricted to more detailed examinations of these fields, with a view to their thorough development. This calls for more detailed topographic base-maps. In like manner, the exploratory examinations of the engineers of the Reclamation Surveys are practically concluded, and the detailed studies of water resources and facilities for water storage and diversion must now be attempted. These problems likewise call for detailed topographic maps.

The result of the working of these various forces is seen in the large area mapped during the past season in Butte County, South Dakota, where about 250 square miles were surveyed on a scale of 1,000 feet to 1 inch, with a view to the completion of the study for the Belle Fourche irrigation project.

In Montana a large area in Choteau and Valley counties was surveyed with considerable detail, in order to furnish data for the Milk River reclamation project. This includes maps on the scale of 1 to 24,000, or 2,000 feet to 1 inch, in the neighbourhood of Hinsdale, Box Elder, and Lonesome, including Lonesome Lake reservoir and dam site; also a stretch of country about 200 miles in length between Hinsdale and Glasgow, Montana. These detailed maps are most interesting, and furnish an excellent study of the topographic forms in the northwestern portion of the United States. In the same general region in Montana surveys of a larger area on the smaller scale of 1 mile to the inch were made about Kremlin, Big Sandy, and Laredo. In Flathead County, Montana, 1,000 square miles were mapped in the neighbourhood of Kintla Lakes on the scale of 2 miles to 1 inch.

In Texas an area of 1,000 square miles was mapped in the neighbourhood of Van Horn, El Paso County, on a scale of 2 miles to 1 inch. In Colorado an area of equal size was mapped on the same scale in the neighbourhood of San Cristobal, in Hinsdale

and Mineral counties. All of the foregoing work was preceded by expansion of primary triangulation to furnish geodetic control, and careful spirit-levels were run everywhere to determine elevations above sea-level. In the neighbourhood of Black Hawk, in Jefferson, Boulder, and Gilpin counties, Colorado, an area of about 250 square miles was mapped on a scale of 1 mile to the inch. Detailed surveys on the large scale of 1,000 feet to 1 inch were made in the neighbourhoods of Idaho Springs, Silver Plume, and Central City, Colorado, in Clear Creek, Gilpin, and Teller counties.

In Washington about 1,000 square miles were mapped about Mt. Adams, in Yakima and Klickitat counties. This is a most interesting region, because Mt. Adams is one of the highest in the northwest. About 500 square miles, on the scale of 2 miles to 1 inch, were also mapped in Whitman County, Washington. In Utah the region about Gilbert Peak, in Summit and Wasatch counties, was mapped on a scale of 2 miles to 1 inch. There was also done a considerable amount of levelling and triangulation and some preliminary mapping in the neighbourhood of Frisco, Utah, in Beaver and Millard counties, on a scale of 1 mile to 1 inch. In the neighbourhood of Telocaset, Oregon, an area of 1,000 square miles was mapped on a scale of 2 miles to 1 inch in Union and Wallowa counties. Also, in the neighbourhood of Grant's Pass a smaller area was partially mapped on the same scale in portions of Jackson and Josephine counties.

In California a large amount of work was done, including maps on the scale of 1 mile to 1 inch, in the neighbourhood of Bakersfield, in Kern county, and of Pleasanton, in Alameda and Contra Costa counties. On the more detailed scale of 2,000 feet to the inch an area about Iron Mountain, in Shasta county, was mapped. In Kern county, with a view to more careful study of great oil development, three areas were mapped on the large scale of 1,000 feet to the inch, in the neighbourhood of Oil Center. In the Sacramento Valley, between Tehama and Sacramento, eight sheets were mapped on a scale of 2 inches to 1 mile, in Glen, Tehama, and Colusa counties. This work will furnish data upon which engineers will make a careful study of the drainage problems in the Tule flats of California.

In the neighbourhood of Kerwin, Wyoming, in Big Horn county, about 1,000 square miles were mapped on a scale of 2 miles to 1 inch, and about half that area was mapped on the same scale in the neighbourhood of Medicine Bow, in Albany and Carbon counties. In Arizona a line of precise levels was extended from Williams to

the Needles along the Lower Colorado River, and considerable topographic mapping is now in progress in various portions of Arizona, but is as yet uncompleted. Topographic parties will also be actively at work all winter in Texas and in southern California.

During the season considerable triangulation was extended in the High Sierras in the vicinity of Mt. Whitney, the highest peak in California. Boundary surveys, to mark the outlines of forest reserves, were completed in various portions of the West, considerable work being done about the Pocatello Forest Reserve, in Idaho, and upon the boundaries of Aquarius, Logan, and Payson Forest Reserves, in Utah. In the State of Montana a portion of the boundaries of the Lewis and Clark Forest Reserve was surveyed.

W.

## THE GEOGRAPHICAL RECORD.

### AMERICA.

INFLUENCE OF CANALS IN OHIO.—The story of the construction of the Ohio canals is well told by George W. Dial (*Ohio Arch. and Hist. Quart.*, Oct., 1904). He says that as the Erie and Champlain canals made New York the Empire State, and as the Pennsylvania canals made Pennsylvania the second State, in the Union, so the Ohio canals made it the third State in importance. In 1829 merchandise was carried from New York City to Dayton, Ohio, by an all-water route of 1,100 miles in twenty days at a cost of \$17.25 per ton. The route followed the Erie Canal to Buffalo, the lake to Cleveland, the Ohio Canal to Portsmouth, the Ohio River to Cincinnati, and the Miami Canal to Dayton. The canal counties immediately took the lead in industrial and agricultural growth—a lead they have never lost, as to-day only thirty out of the eighty-eight counties contain 52 per cent. of the State's population. To provide for a sufficient supply of water at all times, the State began the construction of immense reservoirs. The Mercer County reservoir, containing 18,000 acres, is said to be the largest artificial lake in the world. The canal system cost the State over \$14,000,000, and for a quarter of a century the canals were the most comfortable and convenient means of transportation and travel. Hundreds of sixty and eighty ton freight boats plied up and down between all points; while regular passenger packets, accommodating from forty to sixty travellers, connected with all stage and steamboat lines.

FOREST-PLANTING IN WESTERN KANSAS.—Under the title *Forest Planting in Western Kansas*, by R. S. Kellogg, the Bureau of Forestry has issued Bulletin No. 52 (1904), in which the results of investigations to determine the kinds of forest trees best adapted to western Kansas and the methods of treatment which have proved most successful are set forth. That natural forests are absent on the Great Plains is a well-known fact; but it is also coming to be equally well known that, with intelligent selection of species and proper care, planted trees may, to a considerable extent, supply the deficiency. In time this planting will be sufficient to have a marked effect upon the landscape, and to supply wood for domestic purposes. That forest-planting is problematical as to its effect upon precipitation is generally known, but that it does conserve moisture and check wind-movement is undoubtedly true. By a careful selection of species suited to the special conditions in which the planting is to occur, and by intelligent cultivation, much may be done even in regions as unfavourable, apparently, as western Kansas. The work of the Bureau of Forestry, as is again evidenced by this Bulletin, is being done along much-needed lines, and the next generation will see a very different condition of things as regards tree-growth over the Great Plains than that which is now passing away.

R. DEC. W.

AGRICULTURE IN THE COPPER RIVER COUNTRY.—Major Abercrombie, U. S. A., has read a paper before the Franklin Institute, Philadelphia, in which he expresses a high opinion of the agricultural possibilities of parts of the Copper River country along the line of the military railroad across Alaska, the building of which he superintended in the years 1898–1901. In that period the entire valley, embracing the main and sub drainage of the Copper River, had become well known. A road and bridges had been built between Valdes and Eagle City on the Yukon, roadhouses had been put up, and prospectors had taken \$185,000 of placer gold out of the ground and discovered the copper-bearing ores which add so largely to the natural wealth of that region.

Pioneer horsemen went over this trail in 1898 with hay and grain for their horses. The following year spears of timothy and grain were found along this trail, and there was a volunteer crop in 1900. Major Abercrombie thinks this is conclusive evidence that, when acclimated, grain and grass will mature and bring forth abundant crops. It has been proved in a small experimental garden that potatoes, turnips, beets, peas, lettuce, and radishes

will grow abundantly when the proper soil, exposure, and drainage are obtained.

Major Abercrombie says there will be a demand for such supplies. The Chesna mining district, 250 miles inland from Valdes, will probably produce millions of dollars of gold dust within the next few years. Hay and grain at Valdes are worth, on an average, \$40 a ton. These supplies cannot be transported into the Copper River valley to the Tonsena River for less than twenty-five cents a pound. Excellent opportunities, therefore, now await the small farmer who selects his homestead judiciously along the Trans-Alaskan military road with a view to erecting a bunk-house and barn for the accommodation of man and beast and for the cultivation of forage and vegetables. Major Abercrombie believes that the valleys of the Copper River affluents will also in future years supply the demand for cereals and vegetables, if not meat, of the thousands of miners who will extract the vast deposits of metal in the Chettyna, Kutsena, and other districts. He eliminates the Coast Range region as a source of supply of forage, because, owing to the heavy fall of snow, the spring is generally a month later than in the Copper River valley.

PLANTS AT HIGH ALTITUDES IN BOLIVIA.—In a paper read before the British Association on August 22d last, Mr. A. W. Hill gave an account of "A Journey around Lake Titicaca," in which the characteristics of the vegetation found up to 16,500 feet above sea-level were described. The majority of the plants show a striking uniformity as regards their vegetative habit, and usually grow in rosettes or mounds. They have long tap roots, which enable them to absorb water from the soil at a considerable distance below the surface, and their leaves are usually linear, and often hairy. These peculiarities are induced by the climatic conditions, since the plants have to endure a burning sun during the day, followed by a frost at night, with cold, biting winds. There is often a range of temperature of 70° in a few hours.

R. DEC. W.

#### AFRICA.

KILIMANJARO AGAIN ASCENDED.—The Kibo summit of Mount Kilimanjaro, probably the highest point in Africa, was ascended in the last days of July and the first of August, this year, by three members of the East African Expedition, led by Prof. Dr. C. Uhlig. A letter from Prof. Uhlig to the Berlin Geographical Society (*Zeitschrift*, No. 7, 1904) says that the rainfall in that region has been

uncommonly heavy this year. The great mountain, above 5,500 feet, has most of the time been completely hidden by heavy fog and clouds—a condition that was most unfavourable for climbing. Several glimpses, however, were obtained of the Kibo summit; and as no traces of new snow could be seen, it was surmised that the weather conditions in the higher altitudes had been more favourable. The ascent was more than usually difficult up to 11,000 feet, on account of fog and the water-soaked soil. Above that altitude, however, there was no evidence that there had been heavy precipitation for several months.

At a height of 15,416 feet the party reached the cave at the east foot of Kibo. The surrounding region was much drier than when Uhlig visited it three years earlier, and the snow limit was considerably higher. On August 2 the party ascended through the Johannes Notch to the crater wall of Kibo. The ice-masses in the crater were much smaller than formerly. It was evident that the unusually heavy precipitation at the lower altitudes had not been accompanied by accumulations of snow in the crater. The party spent three hours clambering about the summit, sinking at every step to their knees in the powdered ice and glacier snow.

SLEEPING SICKNESS IN THE CONGO BASIN.—A Reuter dispatch says that the expedition sent to the Congo by the Liverpool School of Tropical Medicine has forwarded a long report on its experiences. The expedition left Leopoldville on June 23, and reached Stanley Falls on Sept. 15. It was able to make fairly complete observations on the spread and distribution of sleeping sickness along the Congo from Stanley Pool to Stanley Falls—a distance of nearly 1,000 miles. The disease is a terrible scourge, especially among the tribes along the river and its tributaries. Its spread has been much assisted by the practice of taking large bodies of natives, soldiers, and labourers from one part of the Free State to another. The transportation of sleeping-sickness patients on the State steamers was forbidden several months ago. The tsetse fly was everywhere present from Stanley Pool to Basoko, at the mouth of the Aruwimi River. They were particularly numerous among the myriads of islands. Above Basoko there were very few flies, and none were seen above the mouth of the Lomami. It is an interesting coincidence that where there were many tsetse flies there was much sleeping sickness. Where these flies were few in number, cases of the disease were rare. The common species of tsetse on the middle Congo is *Glossina palpalis*.

CONDITIONS OF UGANDA.—The British Foreign Office has issued the report of Commissioner Sadler on the Uganda Protectorate for the year ending March 31 last, in which he says: "In social condition the Baganda have continued to make rapid strides, as is evidenced by the building of brick and iron houses by the chiefs, the use of furniture, groceries, and articles in common use in England, and the adoption of European methods of living; and by the commoner people in the change from bark cloth to cotton apparel, the use of petroleum to light their huts, and the increased demand for enamelled ware, boots and shoes, and cheap articles of European manufacture—conditions which are also permeating the neighbouring provinces."

SEASONS OF CROPS IN EGYPT.—A paper on "Egyptian Agriculture, with Special Reference to Irrigation," by P. N. Joannides, published in the *Scottish Geographical Magazine* for November, deals with various matters of importance in connection with agriculture in Egypt, such as the soil, climate, rise and fall of the Nile, composition of Nile waters, and irrigation. The agricultural year is divided into three periods, depending on the rise and fall of the Nile, as follows: 1st, The Shitwi, or Winter Season, which extends from the month of October to the month of May, and sometimes to July. The chief crops cultivated during this period are cereals, beans, clover, poppy, flax, vetches, etc. 2d, The Sefi, or Summer Season, beginning with March and ending with October or November. During this season some of the most important Egyptian crops are grown, such as cotton, sugar-cane, rice, melons, and all kinds of vegetables. 3rd, Last comes the Nili, or Flood Period, which extends from August to the end of October. This is the period of High Nile. Millet and maize are the chief crops grown, though cotton, sugar-cane, and others mentioned under the preceding season, are also under cultivation.

R. DEC. W.

CLIMATOLOGICAL OBSERVATIONS IN AFRICA.—Part I of "Climatological Observations at Colonial and Foreign Stations" has recently been issued by the British Meteorological Office. The data included refer chiefly to stations in the Egyptian Sudan, British East and Central Africa, and Rhodesia, and the years are 1900-1902, with summaries for previous years. The Meteorological Council has for some time contemplated the issue of such summaries of observations received from the Foreign and Colonial Offices, or directly from observers in the British colonies and dependencies,

but this publication has been impracticable until now. The volume was prepared under the supervision of Mr. E. C. Ravenstein, whose name is already well known in connection with African climatology, he having been chairman of a committee appointed by the British Association in 1891 for the collection and discussion of observations from tropical Africa. Sketch maps showing the location of the stations accompany the volume.

R. DEC. W.

A PECULIAR CLIMATIC FEATURE IN CENTRAL AFRICA.—In the *National Geographic Magazine* for November, 1904, S. P. Verner, of the Department of Anthropology at the World's Fair, notes the following interesting climatic peculiarity in the southern part of the Congo valley for about 10° south of the Equator. The rivers and lakes are found to be bordered with a dense vegetation, which extends out from the water a distance proportioned to the extent of the water surface. Adjacent hills and mountains are often covered with dense vegetation on one side and are bare on the other. Beyond this bordering vegetation there are plains, almost treeless or with small scrub growth and thin grass. The explanation is given as follows: From May to October there is a dry season, with hot days and fairly cool nights (often 50° F.). The evaporation of the daytime is followed by condensation into fog at night. This fog moistens the country adjacent to the water surfaces and causes a luxuriant growth of vegetation. The morning winds blow the fog against the exposed sides of hills and mountains and up the valleys of tributary streams. Wherever the fog is not carried the country is dry. The natives reflect this characteristic of their hills by shaving off the hair from one side of their heads. Dense forests are found where the fogs prevail; while out of range of this moisture there is only a sparse vegetation.

R. DEC. W.

CLIMATE OF NORTHERN NIGERIA.—In a recent address before the Royal Geographical Society, published in the *Geographical Journal*, Sir Frederick Lugard, British High Commissioner, gives many interesting facts concerning this new British province. The country is described as a land of "tornadoes," although these must not be confounded with our characteristic phenomenon of that name. Toward the close of the dry season, *i.e.*, at the end of February, wind-storms from the northeast, usually accompanied by thunder and rain, burst with great fury. These increase in frequency, and merge into the heavy rains, which last from July to October. With the ending of the rains, the whole Sudan presents

a vista of prairie fires, and the harmattan wind begins to blow from the northeast. A thick haze obscures objects only a few hundred yards distant; the sun sets as a crimson disk about 5 P.M., and the natives wear veils and other coverings over their mouths and eyes as a protection against the dust. The wind blows intermittently for several days with violence, and then with moderate force, or even abates altogether, but is always from the same quarter, and its favourite hours are from 8 A.M. to 4 P.M. The harmattan heralds cold nights, and in January and February the cold is trying; but these nights add greatly to the comfort of Europeans. Rivers and lakes shrink, as they do in South Africa. Lake Ngami, "whose waves were so great that they are said to have dashed hippopotami to pieces when Livingstone discovered it in 1850," was, when Sir Frederick Lugard lived near it in 1896, "only a dry bed of the smouldering ashes of lacustrine vegetation." Abandoned wells were noted in every direction. In Nyassaland traces of the old level of the lake may be seen far inland to-day, and the Niger becomes less navigable every year. Where steamers drawing 8 feet could ascend within the memory of the present Deputy High Commissioner, 3-foot vessels can now with difficulty make their way for a much shorter period.

R. DEC. W.

IMPROVEMENTS AT THE VICTORIA FALLS OF THE ZAMBEZI.—Now that the Rhodesian railroad has been extended to the Victoria Falls, the British South Africa Company is preparing for an influx of tourists, who are expected to travel 1,600 miles inland to enjoy what Mr. Knight has described as "the most beautiful gem of the earth's scenery." As the falls are over a mile wide and 400 feet high, they are about twice as broad and two and a half times as high as Niagara Falls. The "Park of Peace" is being laid out on the south side of the river. The only building in it will be a hotel five stories high, which is now being erected. From the edge of the park some of the finest views of the Falls may be obtained, and every effort will be made to preserve their beauty and grandeur unimpaired. Another park will be laid out on the north side of the river, but it will be more of a people's park; and will contain zoological gardens and grounds for sports. The site for the town which is to rise here will probably be two or three miles from the cataract.

TRANSVAAL METEOROLOGICAL SERVICE.—In the BULLETIN for September, mention was made of the new meteorological service of the Transvaal. Since the publication of that note, there has come

to hand the *Administration Report of the Meteorological Department of the Transvaal for 1903-1904*, in which there is further information regarding this interesting undertaking. The building for the Government Observatory was occupied during the first week of May, 1904. There are accommodations for the installation of all the usual meteorological instruments, and also for a seismometer to be placed in the basement. The Observatory grounds cover 10.6 acres, but owing to lack of funds the Director's dwelling-house has not yet been begun. The new instruments received from England towards the end of the year 1903 were distributed as rapidly as possible, but four out of seven barometers which were sent by carrier away from railway lines were broken. Continuous records of several of the weather elements were begun at the Central Observatory on July 1st, 1904. Telegraphic or telephonic weather reports are received every morning from 29 stations in the colony.

R. DEC. W.

#### ASIA.

THE ASSAM-BENGAL RAILROAD.—England has added a new railroad, 770 miles long, to the 26,000 miles of Indian lines previously opened. The Assam-Bengal railroad was begun in 1892, and opened for business last spring. It extends from the port of Chittagong in Eastern Bengal, on the northeastern coast of the Gulf of Bengal, to Sadiya on the eastern head stream of the Brahmaputra, not far south of the Tibetan border. Stretching through the eastern part of Bengal and Assam, it opens to commerce a very fertile and populous region, which hitherto has been without adequate transportation facilities. A large amount of the tea of Assam and the jute of Eastern Bengal will hereafter take this route. A part of the line through the Cachar Mountains was very difficult to build, not only on account of the tunnels, bridges, and other engineering works required, but also because it was necessary to bring provisions for the labourers, numbering 25,000 men or more, from considerable distances over mountain paths on the backs of elephants, camels, cattle, and mules.

In June, 1897, a severe earthquake greatly injured about 200 miles of the partly-built roadway and damaged many bridges in course of erection. Many labourers fell victims to malarial and other diseases, and nine members of the engineering force died before the completion of the work. The cost was about \$40,000,000. It is expected that this line, tapping a new and rich country, will give a great impetus to the cultivation and export of tea and jute.

Chittagong promises to develop into a prominent export port.—(*A Travers Le Monde*, No. 47, 1904.)

THE CLIMATE OF THE PHILIPPINES.—By Rev. José Algué, S. J., Director of the Philippine Weather Bureau. Census of the Philippine Islands, 1903. Bulletin No. 2. 8vo, pp. 103. Department of Commerce and Labor, Bureau of the Census, 1904.

In the *Report of the Philippine Commission*, Vol. IV, 1901, pp. 115-357, there was published an elaborate report upon the climatology of the Philippines, with half-tone views of stations and instruments, and many plates and maps. This is the most complete discussion of the subject which we have. There has more recently been issued Bulletin 2, Census of the Philippine Islands, *The Climate of the Philippines*, in which Father José Algué, S. J., Director of the Philippine Weather Bureau, gives a shorter, more compact, and more accessible description of the climatic conditions of the islands. Much of the matter and many of the plates may be found in the first report, above referred to, but we note, as valuable additions, a map, in different shades of yellow, showing the mean annual temperature, and a second map, also in colours, showing the mean annual rainfall. In the former the map shows four distinct regions, classified as being of *high*, *intermediate*, *mild*, and *cool* temperature—the latter cool “because of altitude.” By *high* is meant a mean temperature in the hottest months of 30° or 31° C. (86° or 87.8° F.); by *intermediate*, a mean temperature of not over 29° C. (84.2 F.) in the warmest months; and by *mild*, a mean temperature of April, May, and June not higher than 27° C. (80.6° F.). The fourth division includes stations like Baguio, for example (altitude 4,777 feet), where the temperature averages a good deal lower than on the lowlands. The mean annual rainfall is shown in six different shades of blue—viz., under 40 inches, from 40 to 60, 60 to 80, 80 to 100, 100 to 120, and over 120 inches.

Father Algué has done so much for meteorology and climatology that the following appreciation of him, written by Gen. J. P. Sanger, U. S. A., Director of the Philippine Census, and included in the introduction to Bulletin 2, is well worth repeating here: “The following interesting and scientific account of the climate and storms of the Philippines was prepared for the Philippine Census Report by Rev. José Algué, S. J., the Director of the Weather Bureau, Manila, whose tireless efforts in behalf of the Manila Observatory, and more especially of the Meteorological

Department, and whose scientific investigations and improvements in the instruments used in observing and recording atmospheric changes and in indicating the probable path of the storms, whereby the storm centre can be avoided, have made him the highest living meteorological authority in the Orient, and placed him among the foremost of the world's scientists." A well-merited tribute.

R. DEC. W.

#### EUROPE.

THE DELAY IN COMPLETING THE SIMPLON TUNNEL.—At a recent meeting of Swiss engineers at Winterthur, Mr. Sulzer told of the difficulties which had retarded work in the Simplon Tunnel. These difficulties, he said, were of the nature of surprises, because mistaken deductions had been drawn from surface indications concerning the position of the underlying rocks and the amount of water that was likely to be encountered.

Experts believed that the excavation would be largely through rock strata that had been inclined to positions approaching the vertical. The work of excavation, however, was chiefly through strata in a nearly horizontal position, which increased the difficulty of digging and roofing the tunnel.

According to the official geological profile and the opinion of geologists, the cutting between the kilometres 7 and 12 would be comparatively unimpeded by water; on the contrary, the calcareous schists encountered here were more or less saturated with water, which greatly impeded the advance. The experts had expressed the opinion that on the south or Italian side little water would be met, but that streams would enter the tunnel on the north side at about kilometre 5, a little below the Canter Valley. Here, however, the rock was dry, while large quantities of water entered at places where, according to predictions, none would be found. In August, 1900, about 1,000 litres a second were pouring from the southern mouth of the tunnel. It was thought that the volume of water would diminish; but it has, in fact, increased.

Another surprise was the great difficulty of overcoming the pressure upon the roof of a part of the tunnel. A stretch of 500 metres in the flooded portion threatened to cave in, and no means previously employed to overcome the pressure were effective. Large tree-trunks used as supports were broken. The vaulted roof was sheathed with iron, and forty-four iron supports were put in. The difficulty was conquered only after six months of dangerous work, during which the average advance in excavation was only 25 centimetres a day instead of  $5\frac{1}{2}$  metres.

Another difficulty was the increased temperature which suddenly rose from an expected maximum of  $42^{\circ}$  C. ( $107.6^{\circ}$  F.) to  $55^{\circ}$  C. ( $131^{\circ}$  F.). The temperature of the rock rose even to  $63^{\circ}$  C. ( $145^{\circ}$  4 F.), and the conditions were almost insupportable. With the excellent means provided for lowering the temperature, it was finally maintained at about  $25^{\circ}$  C. ( $77^{\circ}$  F.). Suddenly the temperature fell again, and no one understands the reason for these changes.

Another difficulty was the irruptions of hot water, the first occurring in the southern excavation in August, 1903. This inflow was soon exhausted, but a little later hot water began to flow into the northern excavation at a rate of 70 litres a second, temperature  $48^{\circ}$  C. ( $118.4^{\circ}$  F.). These irruptions neutralized the effects of artificial refrigeration, and interfered most seriously with the work.

Finally a great inflow of water, encountered at 10,376 metres, caused a cessation of work on the north side, and that part of the tunnel was hermetically closed, to prevent the complete flooding, while work was continued only on the south side. These were the causes of delay which compelled the constructing company to ask for an extension of time. The agreement was signed on October 9, 1903, and it was stipulated that the first tunnel and the basal gallery of the second tunnel are to be completed and opened to traffic on April 30, 1905.—(*Bulletin of the Bordeaux Society of Commercial Geography, November, 1904.*)

ODENSE A SEAPORT.—This city, the capital of the richly-cultivated island of Fyen, Denmark, having now been connected with the sea by a ship canal, takes its place among seaports. Centuries ago the little river Odense-Aa was navigable for flatboats to the sea, but early in the sixteenth century this connection with the ocean became unusable, and Odense was consequently an inland town. The new canal is 19 feet deep, and the depth will soon be increased to 23 feet. In place of the small old harbour a large, deep basin with excellent docks has been provided. It is expected that the town will have important development as a seaport.—(*Geog. Zeitsch.*, Vol. 10, No. 10.)

THE INTERIOR OF AUSTRALIA.—In a recent paper on "Some Features of the Australian Interior" (*Scottish Geographical Magazine*, November, 1904), Robert M. Macdonald compares the depressing effect of the desert interior of Australia with the similar effect due to the silence and monotony of the polar regions. The

flora of the bushland districts is characterized by the toughness and hardness of the wood, and by the depth to which the tendrils from the roots of some of the trees penetrate into the soil. In most cases, however, the trees tend to spread their roots out near the surface, in order to secure all possible moisture from the infrequent rains. As is usual in desert vegetation, the trees give very little shade. In one day a "buster," accompanied by a heavy dust-storm, scorched knee-high grass to the roots, "and the bushland had the appearance of a dead world, disturbed only by noisome snakes and deadly centipedes." The Australian "willy-willy," or tornado, is stated to be of frequent occurrence. R. DeC. W.

## GENERAL.

THE OLIVE.—Professor Dr. Theobald Fischer has written a monograph on The Olive (*Der Ölbaum*), which appears as Supplement No. 147 to *Petermanns Mitteilungen*. About twenty-five years ago he gave similar exhaustive treatment to the date-palm. The present treatise, the fruit of thirty years of personal observation and scientific study, is the most complete account ever written of the history, industrial aspects, and geographical distribution of the olive. While the tree is adapted for very wide cultivation, it has most prominently figured in the history of the Mediterranean countries, and is grown far more largely around that sea than in any other part of the world. There are 100,000,000 olive trees in Italy and 300,000,000 in Spain; while in Germany there are only 161,000,000 of all varieties of fruit trees. Although the surface of Tunisia is largely desert, there are 20,000,000 olive trees, and the small island of Corsica, with 36,000,000, is crowded with them.

Cortes introduced the olive into Mexico, but previous to 1810 the olive was one of the plants whose cultivation in Mexico was prohibited by Spain. It has made little progress in that Republic. Much of the southern part of the United States is adapted for olive-growing, and the industry is succeeding, especially in California, where in 1893 there were 278,380 bearing and 328,997 young olive trees; in 1894, 425,000 bearing and 1,360,000 young trees; while in 1895 about 800,000 trees were set out. Dr. Fischer says that the range of the olive north and south and the altitudes at which it will grow are the same in all countries.

AGE OF GLACIER ICE.—Dr. Hans Reusch advances the theory (*Geog. Zeitsch.*, No. 7, 1904) that glacier ice may possibly attain enormous age under conditions where it is especially well sheltered.

To illustrate his idea he describes the Riings glacier, a small Norwegian ice stream that he has recently examined. The glacier occupies a comparatively large area in proportion to the small gathering-ground of the *névé*. Other special features are a raised ridge in the lower part of the glacier running parallel to its length, the extraordinary coarseness of the ice grains, and the clearness of the stream which issues at the lower end, showing that erosion is practically at a standstill. He thinks that the glacier is now practically inert, and from the indications he saw of the small annual amount of movement he suggests that some of the ice existing to-day may have dated from the Neolithic Age. The glacier he describes presents some unusual features, but a weak point in his theory seems to be that it is based upon the assumption that the rate of motion has always been as slow as it is to-day, of which there is no proof.

A PROPOSED GEOGRAPHICAL DICTIONARY.—Dr. Cleveland Abbe, Jr., writes to *Science* (No. 515, p. 649) that he is compiling a dictionary of technical topographic terms. The clearer understanding of the origin of many topographic features has caused a large increase in the number of these terms. We have also adopted many foreign terms for various forms of relief. These terms are scattered through a large mass of literature, and it will be useful to bring them together. Already over 300 terms have been catalogued. Dr. Abbe asks those interested to send him the following data for any topographic term they may meet in their reading:

1. The new term, and the inventor and first user of it in the given sense.
2. The etymology of the term, if possible.
3. The publication, volume, page, and year, where first used.
4. The original definition, preferably *quoted*.
5. The cited examples of the form or combination of forms to which the inventor, or first user, applied it.

THE SMITHSONIAN REPORT FOR 1903.—The geographical articles selected for republication in the *Report* of the Smithsonian Institution for 1903 are Mr. Alfred H. Brooks's description of his exploration to Mount McKinley; President Peary's valuable paper on his North Polar Explorations, 1898-1902; the British and Swedish Antarctic Expeditions, described respectively by Markham and Nordenskiöld; Tsybikoff's account of his journey to Central Tibet and Lhasa in 1900; Dr. Stein's paper on his geographical and remark-

able archæological explorations in Chinese Turkistan; and Oscar Neumann's account of his journey in 1900-1901 from the Somali coast through southern Abyssinia to the Sudan.

## OBITUARY.

DEATH OF MRS. ISABELLA BISHOP.—Mrs. Bishop (Isabella L. Bird, before her marriage in 1881), long distinguished as a traveller, died in Edinburgh on Oct. 7, at the age of 72 years. The results of her first great Eastern journey were published in 1880 under the title *Unbeaten Tracks in Japan*. After 1886 Mrs. Bishop travelled extensively in Persia, Kurdistan, Tibet, China, Corea, and Siberia, and published a series of books on her observations. In 1901, when she was nearly seventy years of age, she rode 1,000 miles in Morocco, including the Atlas Mountains in her journey. She was an accurate observer, took a wide interest in natural phenomena, was an enthusiastic botanist, and had some knowledge of chemistry, all of which helped to give value to her studies of nature and peoples. She usually chose as the scenes of her travels those regions that were coming into public notice, and thus her accurate and careful descriptions had a timely and practical interest.

## NEW MAPS.

## AMERICA.

CANADA.—Map of the Atlin Gold Fields, British Columbia. Natural scale, 1:380,160, or 6 statute miles to an inch. *Annual Report for 1900 of the Geological Survey of Canada* (Vol. XIII). Ottawa, 1901.

The topography is from the instrumental and track surveys of 1899-1900. The geological indications show that the gold-bearing rocks are confined to the greenstones, serpentines, and slates, and lie chiefly along Atlin Lake and Taku Arm.

CANADA.—Geological maps of the East Coasts of Hudson Bay and James Bay from Cape Wolstenholme to the mouth of the Rupert River (3 sheets). Natural scale, 1:506,880, or 8 statute miles to an inch. *Annual Report for 1900 of the Geological Survey of Canada* (Vol. XIII). Ottawa, 1903.

The map embraces the entire east coast of Hudson Bay south of Hudson Strait. It illustrates the report of A. P. Low on his explorations in 1898 and 1899, when he made a log survey of the entire coast, the results of which appear on the map. The colours depicting geologic data extend along the coast and eastward into the Labrador Peninsula, along the Big, East Main, and Rupert Rivers and some other waterways. They show the vast predominance of Archaean and granite, with dikes of diabase trap and the so-called Cambrian, along some parts of the coast and on a considerable number of islands.

CANADA.—Geological map of the Basin of Nottaway River, Northwestern Quebec. Natural scale, 1:633,600, or 10 statute miles to an inch. *Annual Report* for 1900 of the Geological Survey of Canada (Vol. XIII). Ottawa, 1903.

The map accompanies Dr. Bell's report on the basin of this great stream, which issues from the north side of Lake Mattagami and empties into Rupert Bay. As Lake Mattagami is the gathering-ground for all the country to the south and east as far as the watershed of the St. Lawrence, the Nottaway delivers the drainage of a large basin into Hudson Bay. The fundamental rocks are gneisses, crystalline schists, granites, and greenstones. One tint shows the schists, quartzite, etc., which are grouped together as Huronian, and another tint the gneisses of the primitive Laurentian system. The granites, diabase, etc., are indicated by two colours and the exceptional occurrences of some other rocks are shown in red type.

CANADA.—Geological map of Portions of the Saskatchewan, Athabaska and Keewatin Districts. Natural scale, 1:506,880, or 8 statute miles to an inch. *Annual Report* for 1900 of the Geological Survey of Canada (Vol. XIII). Ottawa, 1903.

Eight colours, showing the formations from Laurentian to Cretaceous inclusive. The map accompanies the reports on these regions by J. B. Tyrrell and D. B. Dowling.

DUTCH GUIANA.—Bovenstroomgebied van de Saramacca. Scale, 1:200,000, or 3.1 statute miles to an inch. By A. J. Van Stockum. *Tijds. of the Royal Netherlands Geographical Society*. Vol. XXI, No. 6, 1904.

Illustrates a paper by Mr. Van Stockum, who ascended the upper Saramacca to its two fountainheads among the mountains. His map shows that the upper river is crowded with rapids. A considerable number of native settlements and missionary stations are scattered along the banks. He ascertained and marked the elevations of many of the comparatively low mountains at the head and along the sides of the basin.

#### ASIA.

DUTCH EAST INDIES.—Schetskaart van het stroomgebied der Boven-Tembesi, Merangin en Batang Asaj. Natural scale, 1:200,000, or 3.1 statute miles to an inch. *Tijds. of the Royal Netherlands Geographical Society*. Vol. XXI, No. 6, 1904.

A black map, giving the results of surveys on the upper Batang Asaj and its largest tributaries, which drain a part of south-central Sumatra east of the mountains.

#### EUROPE.

MEDITERRANEAN.—Die Verbreitung des Ölbaumes im Mittelmeergebiet. Scale, 1:10,000,000, or 157.8 statute miles to an inch. By Prof. Dr. Theobald Fischer. *Ergänzungsheft No. 147 to Petermanns Mitteilungen* ("Der Ölbaum"). Justus Perthes, Gotha, 1904.

This map illustrates Dr. Fischer's monograph on the olive. The range of the olive in the Mediterranean lands is shown by green tints, the more intense green meaning more intensive cultivation. The tree is found further inland in Spain than in any other of these countries.

SCOTLAND.—Bathymetrical Survey of the Fresh Water Lochs of Scotland. The Loch Maree District. Four sheets giving the results of Lake Surveys. Natural scale, 1:21,120, or three inches to one statute mile. One sheet giving surface geology of the Loch Maree district. Scale, one inch to two statute miles. Under the direction of Sir John Murray and Laurence Pullar. *The Geog. Jour.*, Nov., 1904.

The maps deal with eleven lochs near the northwest coast of Scotland that drain into Loch Ewe and with two other lochs that fall into the sea just outside the entrance to Loch Ewe. The total drainage area is about 220 square miles. Loch Maree, much larger than all the others together, is the largest sheet of fresh water in Scotland north of Loch Ness. Its length is  $13\frac{1}{2}$  miles and its maximum breadth a little over 2 miles, and it is noted for the great number and proportionate large area of its islands. In the geological sheet, the surface geology is generalized from the maps of the Government surveys. The sheets are fine products of the Bartholomew map house.

#### ATLASES.

STIELER'S HAND-ATLAS.—Neue neunte Lieferungs-Ausgabe. 100 Karten in Kupferstich. Parts 35 and 36. Justus Perthes, Gotha, 1904. Price 60 pf. for each part containing two map sheets.

Of the four maps the only new one is "Russland und Skandinavien, Übersicht." Scale 1:10,000,000, or 157.8 statute miles to an inch. There are insets of St. Petersburg and its environs on a scale of 1:500,000, or 7.8 statute miles to an inch, and of Moscow on a scale of 1:150,000, or 2.38 statute miles to an inch. No. 8 is a revision of the general map of the German Empire and Nos. 51 and 52 are Sheets 1 and 2 of Domann's Map of the Balkan Peninsula in four sheets.

Parts 37 and 38.

Sheet 50 is a revision of the general map of the Balkan Peninsula. Sheet 59, "Klein-Asien, Syrien, &c.," covers the same territory and includes the same insets as its predecessor, but is a new map, having been entirely re-drawn to embrace the results of recent surveys and explorations. Considerable change is to be observed in the contour of the lakes of central Anatolia as now mapped. The large region of the Salt Waste between Koma and Tuz-Tsholu, almost blank on the earlier maps, is filled, on this sheet, with considerable topographic detail. Sheet 99 (sheet 5 of South America) gives the southern part of the continent and a very clear delineation of the new boundary between Argentina and Chile with the many geographical discoveries resulting from these surveys. An inset of the Isthmus of Panama is introduced; in the inset of Valparaiso the outlines of the proposed harbour improvements are sketched. Sheet 100 (sheet 6 of South America), which shows only the estuary of the Rio de la Plata with the enviroing territory in the northwest corner of the plate, replaces the old insets with new maps of the cities of Buenos Aires and Rio de Janeiro and the southern States of Brazil. The settlements of the German colonists, which are very numerous in Rio Grande do Sul and Santa Catharina, including the new colonies recently founded in the forest region of northern Rio Grande do Sul, are admirably presented.

#### FRENCH EXPLORATION BETWEEN THE UBANGI AND LAKE CHAD.

The mission sent out by the French Government to study the large region between the northern bend of the Ubangi River and Lake Chad crossed the basin of the Shari River from southeast to northwest, and was engaged for two years (1902-3) in the work. Mr. Aug. Chevalier, the naturalist, was leader of the expedition,

whose work embraced studies of the agricultural and forest products of that part of Central Africa, the distribution of minerals, the social condition of the natives, and the prospects of development. The results, which were important, are here summarized from Mr. Chevalier's account of the expedition appearing in *La Géographie* (May, 1904).

The region traversed is politically in the French Congo, though the larger part of it is not in the basin of Congo but in that of the Shari River. Generally speaking, Mr. Chevalier says that France has in the French Congo one of the finest colonies, but its resources cannot be made effective without capital, well-paid commercial agents, and equipment for economic development; and these things are as yet lacking.

In ascending the Congo and Ubangi from Brazzaville to Fort de Possel, Chevalier describes the transition from the grass lands of the Congo covered with high herbage to the equatorial forest zone through which the lower Ubangi flows. The chief economic resource of the Congo grass lands are two shrubby specimens of *Landolphia* (rubber); while in the forest zone the useful products are more numerous, and include kolo, wild coffee, vanilla, and copal, besides rubber-yielding vines and the *Funtumia elastica*, the only indigenous rubber tree in Africa. The field crops, such as manioc and bananas, thrive luxuriantly, but, on the whole, this forest region is not yet yielding results commensurate with its latent wealth. The Bonjo natives, who inhabit the northern part of the forests, are cannibals, and, like the Niam-Niams, the cannibals further east, whom Schweinfurth described, are superior to many native tribes. They cultivate over twenty vegetables, and are advanced in iron, wood, and pottery working; yet they are very miserable, for war, disease, and famine have greatly weakened them.

Navigation on the middle Ubangi, with its stretches of rapids, is still very difficult, for nothing has been done to improve it.

At Fort Sibut, north of the Ubangi, an agricultural experiment station was started, and in two months the seeds of 460 varieties of plants were sown or plants transplanted into the garden. The plan is to thoroughly test the adaptability of this region for the cultivation of a large number of African and European fruits, grains, and other plants.

On Nov. 11, 1902, the leader, accompanied by Mr. Courtet, set out from Fort Crampel to the northeast to explore the country of the Sultan Snussi, whose chief town is Ndellé. The water-parting between the Ubangi and Shari basins was formerly well populated,

but has been turned into a desert by famine, war, and the flight of the natives to avoid the portage service. Just north of the water-parting begins the habitat of the Manjias, also cannibals, who are considerably advanced in their arts, though misfortunes have reduced them to a wretched condition. They are grouped in a number of patriarchal clans, and seem to have come originally from the west, though their neighbours, the Bandas, are immigrants from the east.

The journey to Ndellé took twelve days across a region depopulated in many places by slave-raiding. Snussi is the most remarkable black chief Chevalier has met in Africa, and much is to be expected by securing his participation in the efforts of the French to develop his country. He received the explorers with the greatest cordiality, and gave them much information for their maps. For thirty years he had travelled extensively in Dar-Fertit (The Country of Savages), and was able to give them much geographical data. He supplied guides to take them to the elevated region where the Congo, Shari, and Nile basins meet. Here they found a new species of wild coffee, a tree fifty to sixty feet in height, which Mr. Chevalier named *Coffea excelsa*. Its bean has an exquisite aroma, and was seen twenty years ago by Mr. Rivière in the markets of Tripoli. The Arabs know it well, as it is exported to Wadai.

Snussi thought it unsafe for the explorers to visit the Mamun marshes, but finally permitted them to make the journey under the protection of an escort. They had heard that these so-called marshes were really an inland sea, comparable with Lake Chad, but they found nothing but a marshy plain about 100 miles long, in which the five rivers, Tete, Mosuburta, Bungul, Minjia, and Kumara, converge. No European had previously seen these rivers excepting the Minjia, which Potagos reached near its source.

The name Mamun is especially applied to a lagoon,  $2\frac{1}{2}$  miles long, and 240 feet wide, the haunt of hippopotami, in the centre of a tract which must be largely under water at the close of the rainy season. This region is the counterpart of the more westerly marshy districts between the middle Shari and the Mayo Kebbi, recently described by Lenfant (BULL., No. 7, 1904, p. 429). The clay soil of its wide, bare plains is unproductive, but there are many varieties of game. Among the larger fish in the rivers is the huge *Lates Niloticus*, and in the stagnant waters are two remarkable fish. One of them, the *Protopterus*, called *Abkur* by the Arabs, encloses itself in a cocoon when the marshes dry up, and is several months without water; the other is the *Malopterurus*, which gives

a violent electric shock to those who touch it. The *Bojene*, a fly of the genus *Glossina*, infests the marshes, and, like the tsetse, its bite is fatal to horses and cattle. Returning to Ndellé through a corner of Dar Runga, the explorers visited the curious sandstone *massif* Kuti, whose streams flow in cascades down the deep gorges under the shade of oil-palms.

Mr. Chevalier found the Sultan Snussi gathering a successful harvest from an experimental sowing of Arab wheat. His women were also sowing rice on a large scale, and the Sultan was making efforts to acclimatize cattle and horses that had been brought to him from Wadai. Under his auspices commerce is steadily increasing.

The explorers reached Fort Archambault, on the Shari, on May 22. Dr. Decorse, who had been left behind on account of ill-health, had been there over two months, and had made most valuable ethnographic and zoological collections. The district around Fort Archambault is the home of the Sara tribe, whom Chevalier regards as one of the most promising native peoples. They are exceptionally tall and well proportioned and mild and peaceable in disposition and industrious agriculturists. They have a hardy breed of small horses, which, however, are not numerous. Fine trees shade their thriving fields, which recall the fertile belt of the western Sudan.

As the expedition proceeded towards Wadai the type of the country and the people rapidly changed, and Chevalier's description of this region is very interesting. The first river met was the Bahr Keita, or Auk, in which the waters of the Bungul are combined with all the streams of the Mamun plain and Jangara. It is, however, a small stream, nearly dry in the dry season. In this zone of low-lying plains the swamps and old sand-obstructed channels absorb much of the water, so that the streams are more important in their upper than in their lower courses.

The Bahr Salamat, a little farther north, is the only river of Wadai which brings any water to the Shari. It is dry during a large part of the year, is 200 yards wide in the neighbourhood of Lake Iro, and water flows only four or five months between its banks, cut 16 feet deep in the clay. From Dar Runga to the Shari it flows through a bare plain of impermeable clay, full of depressions, which collect water during the rains. Lake Iro, measuring only 11 by 5½ miles, including the wide grassy margin which is flooded annually, is the largest basin. About a dozen tribes, each independent of the others but all of the Kulfe or Gulla stock, live

around the lake. Their villages are built on the higher grounds above the flood limits, and are fortified by fences of spiny shrubs, in the midst of which are circular clay huts with entrances, so small that the occupants must crawl in like cats. These entrances are made very small for protection against wild animals, which come during the dry season in large numbers to drink at the lake.

The people move about at ease through the mud and water during the six months of inundation; and as their legs are abnormally long for the size of their bodies, they might be taken for a special race of amphibious beings if they were not apparently nearly related to the Kabas and Eastern Saras. The latter tribe are of robust physique, but the raids of their neighbours have greatly impoverished them. Their women are greatly disfigured by the objects which they insert in their ears, noses, and lips. They introduce into the lower lip wooden discs, which are sometimes as large as a small plate.

A dreary plain with thorn scrub and dum-palms, and here and there grassy depressions inundated during the rains, stretches away into the heart of Wadai. Many of the ancient water-courses are now completely choked with sand. Other channels have an annual flow of water for one or several weeks during the year. The whole country which forms part of the belt of impermeable clay stretching from the middle Niger to the Nile must once have been traversed, like the Netherlands, by a network of channels. The greater part of Bagirmi is composed of similar country.

Mr. Chevalier gives a vivid idea of the great decadence of Bagirmi since Barth described it. Mohammedan colonies are found from the tenth parallel northward. The flow of water in the south is very uncertain and cannot be relied upon for regular navigation. Rabah, in founding his short-lived empire before the French entered the Central Sudan, destroyed Massenya, the capital of the country, and Chekna is now the capital. It stands on the bank of the Ba-Mbassa and when the bed of this stream is dry, from March to October, the town is almost without water and presents a miserable appearance. Most of the goods in its market are of English origin, coming chiefly from Yola, on the Benue. The trade, however, is insignificant. The traffic across the Sahara through Kanem has entirely ceased, but a small amount comes from Khartum through Wadai. Massenya is merely a heap of ruins.

The Sultan of Bagirmi received the expedition very cordially. He is, like Snussi, one of the great personages of that part of Africa; but much time will be required to restore the State to its former

prosperity, even though France may do everything possible for its recuperation. Barth estimated the population at 1,000,000, but the inhabitants now number only one-tenth as many. The country, however, has the elements of well being, though the whole northern part of it, in the clay zone already mentioned, is exceedingly poor.

Mr. Chevalier saw many signs that the water systems of this part of Africa were formerly of much greater extent. He thinks it probable that a great river once flowed north across the Sahara to the Mediterranean, Lake Chad being merely a back water. The abundant relics of the Neolithic Age, found in northern Wadai and in the regions adjoining the Bahr-el-Ghazal, indicate that prosperous communities once lived there. Vegetable and animal remains found in these countries give many proofs of a progressive desiccation, and of the invasion of the Sudan by a Saharan climate.

The process is not regularly progressive, for Lake Chad has sometimes spread beyond its usual bed as a result of several years of abundant rainfall. Large areas have thus been flooded, and the lake has retreated to its former limits only after a number of years. In 1870 the lake rose to an unusual height; and another rise took place in 1897, but since that time the waters have continued to fall. As a result of the drought in 1902, Lake Fitri completely dried up in the following year, and hippopotami which inhabited it have gone elsewhere. The same fate has overtaken other lakes. He says no illusions should be cherished as to the value of Kanem, which borders Lake Chad on the northeast, for it is a dried-up country.

In spite of the present ruin resulting from generations of slave-raiding, Mr. Chevalier says that the resources of the Central Sudan will give it large value when the policy of peaceful development has borne fruit. He divides the Central Sudan into three zones, each with its proper products, the intermediate one having the largest population and the richest agricultural opportunities.

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#### BOOK NOTICES.

*Railways in Rhodesia.* By E. H. Smith Wright. *With a Description of the Victoria Falls* by E. F. Knight. 56 pp., 3 maps and many illustrations. London: British South Africa Company, 1904.

A handsomely-printed book, giving the history of the development of railroads in Rhodesia, including many novel incidents connected with the work. It appears that the Portuguese Government,

by treaty with Great Britain, agreed to build a railroad across the Portuguese territory to the British sphere of influence (Rhodesia), but it was not until the right to build the railroad had been transferred to the British South Africa Company that this Beira-Salisbury line was constructed. Twenty-six pages are given to Mr. Knight's graphic description of Victoria Falls, with many very fine illustrations. The book concludes with a chapter on the prospects of farming in southern Rhodesia, with numerous half-tone illustrations of maize and wheat fields, tobacco and cotton plantations, orchards and potatoes, that seem to prove the truth of the assertion that "Rhodesia offers attractive prospects to the man of energy and enterprise equipped with some knowledge of agriculture and a capital of £500 to £1,000, if he is prepared to be content with a modest competency and not a fortune."

*British Nigeria. A Geographical and Historical Description of the British Possessions adjacent to the Niger River. By Lieut.-Col. A. F. Mockler-Ferryman. viii and 351 pp., map, illustrations, appendices, and index. Cassell & Co., Limited, London and New York, 1903.*

The volume is a revision and in part a rewriting of the author's book "British West Africa" published in 1898. Though written for the general public instead of the special student, the aim of the writer was to give sound and accurate information; and he has succeeded well. His introductory chapters on the exploration of what is now British Nigeria are very interesting; but it is strange that he should have omitted from the list of explorers whose achievements he records men who did such good work in the present British territory as the Germans Rohlf, Flegel, and Staudinger. He describes the gradual acquirement of the territory by the British, the various Governments which have ruled it from the Royal Niger Company to the present Administration, tells the interesting story of the old Fulah Empire, and of the independent kingdoms whose territories are now embraced in Northern Nigeria, and describes the people and their institutions.

In his chapter "The Crescent and the Cross" the author says:

As long as polygamy and domestic slavery exist, Christianity can make no great strides among either Mohammedans or pagans. To expect a pagan chief to discard thirty-nine of his forty wives, to illegitimatize, say, a hundred children, and to free all his domestic slaves, in order to become a Christian, is, of course, absurd. So also with the Mohammedans; a change of faith would be little to their worldly advantage. Domestic slavery may, in the distant future, be abolished by law; but no British official will ever interfere in the matter of polygamy, which must remain the chief obstacle to the conversion of the Mohammedans.

The book cannot fail to help its readers to follow with intelligent interest the transformation, remarkable in some respects, that is being wrought in this part of the western Sudan.

*New Land. Four Years in the Arctic Regions. By Otto Sverdrup. Translated from the Norwegian by Ethel Harriet Hearn. With illustrations and maps. In two volumes. Longmans, Green & Co., London, 1904.*

Captain Sverdrup's book *New Land* is characteristic of the man, the man characteristic of the book. Man and portrait and book are homogeneous, and alike solid, quiet, direct.

In numbers of ways the two attractive and convenient-sized volumes which present to us the story of Captain Sverdrup's four years of work are unusual. Typographically and pictorially attractive, they differ pronouncedly from most previous Arctic narratives in lacking the higher flights of fancy, the searching after the infinite, the communings with nature, from which most writers have found it difficult, if not impossible, to refrain. Sverdrup's narrative is practical, direct, and clear. If at any time under the influence of his inseparable pipe the poetic afflatus came to him, he wasted little time or ink in putting the results down for his narrative.

The books should be read by every one who is interested in and endeavouring to keep in touch with the progress of Arctic discovery.

As to the geographical results of the four years of steady, sturdy, persistent struggle of Sverdrup and his companions with the obstacles and privations of the North, there can be but one opinion. They are of high importance.

Sverdrup has well filled out a large space in the Arctic regions, which it is surprising has not been penetrated before, being one of the most accessible parts of the Arctic *terra incognita* of our charts.

That, after a year's effort to carry out his original programme of attaining the northwestern shores of Greenland, and perhaps circumnavigating that country, he gave up those plans and turned to a region and a programme equally valuable and less beyond his powers shows his adaptability.

That he was obliged to do this was undoubtedly due more to the ship than to the man. The *Fram*, well adapted as she was for her original purpose of drifting with and passively resisting the attacks of the Polar ice-floes, was particularly ill adapted, both on account of her model and her lack of power, for assuming the offensive and forcing her way through ice moving in the opposite direction.

To the writer one of the interesting features of the narrative is the difference in behaviour of the musk-oxen in the extreme western lands, as compared with some other portions of the Arctic regions. This difference is due, perhaps, to differences in methods of hunting by the white man and the Eskimo.

While Sverdrup personally and the members of his party were in imminent danger from the musk-oxen, and at other times were able to secure the game only with the greatest difficulty, the writer's own experience during a period of over four years in the regions east and north of Sverdrup's discoveries was that no member of his party was ever in danger from musk-oxen, and that seeing a musk-ox was tantamount to securing him. The writer has personally killed musk-ox bulls with the revolver and with the Eskimo lance, and has known them to be stabbed at close range by a member of his party.

A herd of a dozen were driven away from the bodies of two of their fallen companions on the northern shores of Greenland with the utmost difficulty, by throwing stones at them at short range, it not being desired to shoot any more than were absolutely needed for the immediate necessities of the party.

The incident of the fire on the *Fram* must have been one of serious import to the party, and emphasizes the importance of having nothing of a light, combustible character on or about a ship wintering in the Arctic regions; and particularly emphasizes the precaution of having all explosive and combustible substances, as petroleum, gasoline, gunpowder, gun-cotton, alcohol, and the like, removed from the ship immediately she reaches winter quarters and kept stored some distance from her in a number of small depots.

In his four years' travels and discoveries Sverdrup has lifted out of the Arctic mists and darkness a larger area of land and sea than any one else since the days of the great pioneers, and his work will stand as an enduring monument to the special fitness of the Norsemen for the work of northern exploration.

In looking at his chart and noting the comparatively short distance separating his farthest north from Aldrich's farthest west, the eye involuntarily wanders west and southwest on a course tangent to and penetrating the yet unknown region beyond Sverdrup's farthest. It will be an attractive and valuable journey for some future explorer to attempt a line southwest from Cape Alfred Ernest to the western point of Prince Patrick Island.

R. E. P.

*Dutch Self-Taught. With Phonetic Pronunciation. By Captain C. A. Thimm. 120 pp. E. Marlborough & Co., 51 Old Bailey, E. C., London, 1904. (Price, 70 cents.)*

*Japanese Grammar Self-Taught. (In Roman Characters.) With Phrases and Idioms. By H. J. Weintz. 184 pp. Same Publisher and date. (Price, \$1.50.)*

These small volumes are part of a series of manuals covering most of the European languages, including Turkish, and also Arabic and Hindustani. The vocabularies embrace most of the words used in ordinary conversation. The pronunciation, phonetically expressed with each word, is very helpful, the grammar gives the elementary training required, and the method encourages the use of the spoken language. The books should be especially useful to travellers and merchants. The author of "Japanese Grammar Self-Taught" says of the Japanese language:

The simplicity of the language is shown by such facts as that there is only one person in each tense, no long lists of exceptions to rules, and that it is purely phonetic. One may make himself perfectly understood after far less time spent in study than is necessary in the case of any European language. Of course, to attain anything approaching syntactical accuracy a much longer course of study is necessary than for obtaining an equal degree of proficiency in French, German or Spanish.

*Our West Indian Neighbors. By Frederick A. Ober. 433 pp., 54 illustrations, map, and index. James Pott & Co., New York, 1904. (Price, \$2.50 net.)*

The work of a well-known descriptive writer, who lived for two years in the West Indies, making ornithological collections, and who has since refreshed his impressions of that island-world and received many new ones. The purpose of the book is not especially serious, but those who read its entertaining pages will not fail to catch many vivid glimpses of the Caribbean Islands, and understand why they have so much fascination for the nature-lover and the traveller. Mr. Ober thinks that the two great attractions of Porto Rico (he spells it, in defiance of Congress, Puerto Rico) are the city of San Juan and the military road over the mountains between that city and Poncé. He finds Jamaica the paradise of cyclist, automobilist, and pedestrian. He was the first American to see the now famous boiling lake of Dominica, and his fine photograph of it is one of the most interesting of the many excellent illustrations. He says the American colonists in Cuba appear to be flourishing, and have proved that Americans can thrive there, and that the island has in it the making of many a fortune.

*Das Überseeische Deutschland. Die Deutschen Kolonien in Wort und Bild.* viii and 679 pp., 6 colored maps, 21 page plates, and 237 pictures from photographs in the text. Union Deutsche Verlagsgesellschaft, Stuttgart, Germany, 1902.

It is characteristic of many German geographical works of a popular nature that they are not superficial, but are written by trained geographers or advanced students who know the kinds of facts required to convey correct ideas of a country from its physical geography to its trade, and use these data with critical judgment. To mention the fact that among the eight men who have made this book are writers of international reputation like Dr. Karl Dove, of the University of Jena; Dr. Reineke, the explorer of the Samoan group; Dr. Seidel, of the *Deutsche Kolonial Zeitung*; Director Beck, of the New Guinea Company, and Captain F. Hutter, the explorer of the Camaroons, is to say that the book, if not exhaustive, is authoritative with respect to the large areas that form Germany's colonial empire. It has the advantage over earlier books covering much of the same ground that it describes most of the colonies in their present state of considerable advancement.

*Honduras. Edited and compiled for the International Bureau of the American Republics by Alfred K. Moe, U. S. Consul at Tegucigalpa.* 252 pp., 2 maps, illustrations and index. Government Printing Office, Washington, 1904.

Consul Moe has handled his data with considerable geographical discernment. His introductory chapter gives a very good idea of the geography of the country and of the influences exerted by geographical environment upon the distribution of population and the material development of the State. The control exercised by geographical and other influential factors is, however, not emphasized as might properly have been done, and it is unfortunate that the volume contains no physical map to illustrate the author's remarks on the great variety of topography and its manifold effects upon climate. The broader features of the mountains, plains, and lowlands might at least have been delineated as Sievers has done for Venezuela and Sapper for parts of Central America.

Lack of good means of transportation is one of the reasons for the very backward position of the Republic, and Consul Moe places first among the causes for its poor showing in trade "the rapacity of foreign promoters, especially Americans, who have obtained concessions merely for financial speculation and are humbugging both the natives and the American investors." There are two sketch

maps, one showing the distribution of resources and the other the telegraph system. The economic map is especially informing, but is most crudely produced. It might better have been used to supply the data for a good map. Neither map shows the Bay Islands, though they are one of the chief sources of export fruit.

*La Nouvelle Zélande. By the Count de Courte. vii and 268 pp., and 85 photographs. Hachette & Co., Paris, 1904.*

The author has been the French Consul in New Zealand. He is in love with the country in most of its aspects; describes the islands and their development with enthusiasm and in a manner that sustains interest, shows many fine photographs of land and people, and also a black map that is too small to serve the needs of careful readers of so large a book. His work is essentially popular, but the author aims, with a good degree of success, to convey accurate impressions of the Maoris, the white colonists, their various interests, and the geographic environment. Few works on New Zealand have been so copiously and beautifully illustrated.

*Die Entwicklung Japans in den letzten fünfzig Jahren. By Otfried Nippold. 42 pp. K. J. Wyss, Bern, 1904.*

A lecture delivered before the Bern Geographical Society, in which the writer gives the facts of largest significance in the wonderful development of Japan, and emphasizes the idea that in spite of the Occidental science they have superficially acquired, or really assimilated, the Japanese remain through and through an Oriental people.

*Italy from the Alps to Naples: Handbook for Travelers. By Karl Baedeker. xlii and 424 pp., 26 maps, 44 plans, and index. Karl Baedeker, Leipzig, 1904.*

This guide-book has been compiled from the three detailed Baedeker volumes for Northern, Central and Southern Italy. It is designed for the use of travellers who have only four or five weeks to spend and wish to give most of their time to the attractions of Rome and Naples. The most conspicuous towns and parts of the country, famous for scenic or other attractions, are described at length, while the features of other districts are more summarily treated.

*Richesses Minérales des Possessions Russes en Asie Centrale. A Report to the French Ministry of Public Instruction. By E.-D. Levat. 174 pp., 5 maps, and appendices. Vve. Ch. Dunod, Paris, 1903.*

The author, who is a mining engineer, was in charge of the mis-

sion sent to Central Asia to study the mineral resources of the Russian possessions. He describes at length the occurrence of a large variety of metals in Russian Turkistan, and says they will be of great economic importance as soon as railroad extension makes them accessible. He believes that the copper mines will be first developed, as it is the policy of Russia to assist in the opening of the copper regions throughout the empire in order to reduce the present large imports of that metal. The black maps show the distribution of placer gold, coal, copper, naphtha, and argentiferous lead.

*Das Mittelmeergebiet.* By Prof. Dr. A. Philippson. viii and 266 pp. Illustrations, 10 maps, and index. B. G. Teubner, Leipzig, 1904.

The contents of this book were originally prepared as a course of lectures for women teachers in a summer school. The work has now been enlarged and adapted for the reading and study of a far wider circle. Geography is the central thought. The scope of the book is limited to the geography of the Mediterranean countries and the influences which geographic environment has exerted in making the people of these regions and their institutions what they are. Dr. Philippson has written much of Greece and other Mediterranean lands for his brethren in science; but this book is not above the comprehension of the mass of intelligent persons, and the large subject is treated in a delightful as well as a masterful manner. The author leads up to the geography of the region through a chapter on its geology, describes the waters, the animal life and the economic value of the great inland sea around which these nations are clustered, and then takes up the lands themselves, their coasts, climate, hydrography, topography, flora, fauna, and, finally, the human element, the races, religions, states, and social and economic conditions. The illustrations from photographs are superior, though not numerous. The black sketch maps show the arrangement of mountain chains, isotherms for January and July, the annual precipitation, summer rainfall, density of population, and the distribution of vegetable types, races, religions, and the chief towns and trade routes.

*Historische Geographie von Mitteleuropa.* By Prof. Dr. Konrad Kretschmer. viii and 650 pp., and index. R. Oldenbourg, Munich and Berlin, 1904.

This handbook is a work of enormous labour and erudition. As political and cultural geography are profoundly influenced by physical geography, the author first devotes 136 pages to the

physical features of central Europe. The chapters following treat of the political and cultural geography of that part of Europe in six historical periods (ancient times and about the years 1000, 1375, 1550, 1650, and 1770 A. D.). Each subdivision of central Europe has its own paragraph in the chapters on each of these periods, the full index giving ready access to all information. There is a separate chapter on the distribution and history of each of the bishoprics during the Middle Ages. The work abounds with curious information, and traces the development of influences that were vital in their relation to the subsequent history of the people and their institutions. The origin of many Germanic place-names, the history of Germanic colonization, agriculture, the management of forests, the facilities for trade and transportation in the several epochs, are a few among the topics discussed. Prof. Kretschmer has written a very valuable source-book of history, and has imparted special interest to it for students of geography by connecting geographic influence with historic result.

*Studia Pontica. A Journey of Exploration in Pontus. By J. G. C. Anderson. 104 pp., illustrations, and 9 maps. No index. H. Lamertin, Brussels, 1903.*

The volume continues the descriptions previously published of the explorations in the central and easterly districts of Anatolia which the author began in 1896. His work in Pontus during the summer months of 1899 is recorded in this book. His purpose was chiefly archæological. He succeeded in identifying some of the roads and ruins as of the Roman or other periods, deciphered inscriptions, collected pottery, and, after the manner of Ramsay, sought for every kind of testimony that might throw light on the history of Asia Minor. The perplexing problems set before archæologists would be fewer if ancient builders had labelled the sites of towns, as was the case at the site of Comana, where two inscriptions bearing the name of the town were built into a bridge, while one of them affords a means of fixing precisely the era when the bridge was in use. A series of nine maps shows sections of the routes followed among these northern mountains. The fine illustrations of towns, mountains, and plains are from photographs.

*Scientific Results of a Journey in Central Asia, 1899-1902. Vol. 1. The Tarim River. By Dr. Sven Hedin. 523 pp., 446 illustrations, 17 maps. Lithographic Institute of the General Staff of the Swedish Army. Stockholm, 1904.*

This volume, devoted to the Tarim River, is the first of the four

volumes which will contain Dr. Sven Hedin's own text descriptive of his latest great journey in Central Asia. Volume II will be given to Lop-nor; Vol. III to Northern and Eastern Tibet, and Vol. IV to Central and Western Tibet. Volumes V and VI, which will complete the literary portion of the work, will contain the dissertations of Dr. Hedin's colleagues concerning his observations and collections. Each of the four volumes written by Dr. Hedin will contain about 2,000 pages, and the whole work will be completed by the Atlas, to embrace about 100 sheets, including the general map, in 16 sheets.

Vol. I is a superb quarto, as the remaining volumes will be. The work could certainly not have been published in so admirable a manner without Government support or a munificent patron. As it is, Dr. Hedin says that the 75,000 kronor granted by the Swedish Parliament will not be sufficient to cover the cost of the work.

The volume is a purely physico-geographical description of the Tarim River and its region, and is explanatory of the Atlas sheets, which Dr. Hedin regards as the *pièce de résistance* of the entire work. It was written by the author as a topographical, morphological, hydrographical, and orographical description of this part of Eastern Turkestan; and Dr. Hedin has admirably carried out the purpose he had in view. What Dr. Hedin desired to supply in his text may best be told in his own words (*Geog. Jour.*, November, 1904, p. 536):

What I am in a position to offer to geographers and serious students of geography is only a faithful geographical description, rather dry, but rich perhaps in new facts and geographical discoveries. For this reason I have arranged my text in diarial form, recording each day the observations made, so that in this way the text furnishes a detailed commentary, day by day and sheet by sheet, to the maps in the atlas. This has rendered my task easier and readier of accomplishment, and the connected study which, with the help of Supan's "Physische Erdkunde" and certain other text-books, I made whilst the journey was in progress, is thus reproduced in my book in its natural order and sequence of development.

The book has no index, because, as the author explains, the first and second volumes, which treat of the geography of Eastern Turkestan, are so intimately connected that Dr. Hedin thought it better to give them a common index, which will be printed at the end of Vol. II.

No quotations are made from other geographical literature, for the reason that the author found it impossible to do anything in the way of comparative geography, because, with his work in the field and the preparation of his observations for publication, he has

found it quite enough to write down without ornament the bare story of his own independent observations.

The volume, divided into thirty chapters, treats of the Tarim River, the remarkable lakes beside the lower Tarim, the Cherchen Desert, and the Tarim delta. In other words, it deals with the Tarim system from Lailik to Abdal, together with the part of the great sandy desert situated between the lower part of the Tarim and the Cherchen-Daria. Dr. Hedin's description of the Tarim system is interrupted by an account of the desert of Cherchen, in order to enter upon a discussion of the desert lakes of the Tarim immediately after describing that river, the two subjects being inseparably connected. The general view of the Tarim system is therefore postponed to the second volume.

The book is profusely illustrated. Most of the autotypes, which predominate, are particularly clear and beautiful, and are reproduced from Dr. Hedin's own photographs. There are also many of his excellent drawings, which help the text, besides 39 lithographic plates, 17 maps, and 95 vertical sections or profiles through the Tarim and its tributaries, showing their depth, breadth, and velocity.

The volume deals exclusively with the country and not with the people, but there are many groups of natives among the illustrations. Among the most conspicuous and interesting features are the description and the plates given to the numerous elongated and, in part, parallel lakes lying close to one another on the right bank of the Tarim—all of them fed by small channels from the river; and the letterpress and plates illustrating the gigantic ridges of sand which stretch diagonally across almost the entire Desert of Cherchen to the Cherchen-Daria. The sand, says Dr. Hedin, is arranged in waves, presenting the same appearance as the waves of an ocean across which a hard and steady wind is blowing. These and other physical problems, which Dr. Hedin treats at length, enhance the great interest of the volume, and supply some novel data for the consideration of physical geographers.

*Present-Day Japan.* By Augusta M. Campbell. *x* and 331 pp., 75 illustrations, and index. J. B. Lippincott Company, Philadelphia, 1904.

The author lived for some time in Japan, travelled much without dependence upon guide or interpreter, stopped at native inns, and improved many opportunities to study the inner life of the people. Her book is, therefore, not a record of first impressions,

but of those received after some familiarity with the country and its inhabitants. If the author had not mentioned in her preface that letters to her friends formed the groundwork of her book, the fact would not have been perceived; for the matter is solid, though lighted with humour, and arranged with a view to continuity in the treatment of the various topics. This extract from a description of factory girls in some silk-reeling works is a fair example from these entertaining pages:

Little creatures they were, all tidy and clean in their cotton kimonos of grey or blue, their hair tied up in the inevitable handkerchief, their little hands white and boiled-looking, as they kept plunging them into the hot water for cocoons. They sit thus all through the long monotonous day—I believe fourteen hours are not unusual—yet they seemed perfectly cheerful and contented, smiling and chatting, each quietly with her neighbor, hardly looking up, even at the intruding foreigners. No clattering in this mill beyond what was made by the machinery. No dirt; no loud voices raised, either in merriment or in quarrelling. I think few things strike one more in this country than the contrast between its mill hands and ours. I do not mean to suggest that Japanese mill hands are models in every respect, or even remarkable for docility. . . . All I mean is that they are more agreeable in their manners.

Special chapters are given to the Shinto faith, still the State religion, and to the sects and rites of Buddhism, which have greatly modified the national faith, and both creeds now flourish side by side with modern agnosticism. The ways and means of travelling, the drama, the shops and factories, the most notable art products, and the characteristics of the chief cities are, among other topics, presented in a most interesting and informing manner.

*Thirty Years in Madagascar. By the Rev. T. T. Matthews. (Second Edition.) 384 pp., 62 illustrations from photographs and sketches, a map, and index. The Religious Tract Society, London, 1904.*

Most of the material for Mr. Matthews's valuable work is based upon his own studies of the island and the Malagasy as a missionary of the London Missionary Society. Beyond a very brief description of the island the book is not geographical; but it is perhaps the best account yet given of the progress of missionary work in Madagascar, and of the influences for good or for evil which Christian missions and other foreign agencies have exerted upon the development of the people. The author says that under French rule everything has been changed, some of the changes being decidedly beneficial and others not so. He thinks the machinery of government is unnecessarily complex:

First of all is the civil administration, divided into sixteen or eighteen departments, including public works, mines, education, exchequer, landed estates, forests, agriculture, police, topography, taxation, post and telegraph, etc. There are numer-

ous law courts, both French and native, as well as a health department with hospitals, dispensaries, military infirmaries and ambulances. Then there are the administrators of provinces, fourteen in number, with their subordinates and a whole tribe of native functionaries; and added to these is the army of occupation, many parts of the country being still under military control.

Religious liberty now really exists, and the Protestant missionaries have absolute freedom to go about their work in their own way. With 80,000 church members, 80,000 children in its schools, and 280,000 native adherents when the French brought their rule into the country, the work of the London Missionary Society has certainly had wonderful development.

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### NOTES AND NEWS.

1854-1904

AMERICAN GEOGRAPHICAL SOCIETY.

FIFTIETH ANNIVERSARY DINNER.

A subscription dinner to commemorate the fiftieth anniversary of the incorporation of the American Geographical Society will take place at Delmonico's, December 21, 1904, at seven o'clock P.M. The cost of a plate will be ten dollars.

It is hoped that ladies will be present, but smoking is to be expected after the dinner and during the speeches. A gratifying number of Fellows have already signified their intention to participate.

Distinguished guests have been invited.

Fellows who desire to attend and have not already sent in their names should do so at once to the Secretary of the Society at No. 15 West Eighty-first Street.

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THE ANNUAL MEETING OF THE SOCIETY will be held at Mendelssohn Hall, No. 119 West Fortieth Street, on Tuesday, January 24, 1905, at 8.30 o'clock P.M.

The reports of the Council and the Treasurer will be submitted and the election of officers will take place.

Information has been received that Dr. Otto Nordenskjöld, the leader of the Swedish Antarctic Expedition of 1901-1903, will arrive in New York early in January, in time, it is hoped, to accept the invitation, which has been extended to him, and address the Society at the Annual Meeting.

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THE TITLE-PAGE, TABLE OF CONTENTS AND INDEX of the BULLETIN, Vol. XXXVI, will be distributed with the number for January, 1905.

# INDEX TO VOL. XXXVI.

	PAGE		PAGE
Abbe, Cleveland, Jr., Proposed Geographical Dictionary.....	764	Albania, Stransky in.....	167
Abercrombie, Maj., On the Copper River Valley.....	753	Alger au Congo par le Tchad, Par F. Foureau, <i>noticed</i> .....	566
Aboriginal Pottery of the Eastern United States.....	269	Algué, José. Climate of the Philippines, <i>noticed</i> .....	760
Accessions to the Library. 177, 371,	623	— Cyclones of the Far East, <i>noticed</i> .....	705
Adams, George I.....	245	Along the Andes. By A. Petrocokino, <i>noticed</i> .....	252
Africa, American Explorers in.....	186	Alpenflora, Geschichte und Herkunft der schweizerischen. M. C. Jerosch, <i>noticed</i> .....	709
— Boundary Delimitations, Results of.....	282	Alps, Eastern. Baedeker, <i>noticed</i> ..	253
— British Central. Protectorate. 45		Altitude, Effect of, Tibet.....	486
— British East, Settlement in... 611		Altitudes, Canada, Dictionary of..	231
— Climatological Observations..	756	— Mexico and Central and South America.....	610
— East, Uganda and Zanzibar. Handbook, <i>noticed</i> .....	574	America and Asia, Unity of race in tribes.....	42
— From South to North through Marotseland, A. S. Gibbons, <i>noticed</i>	570	— Central, Altitudes.....	610
— German East, and the Congo Boundary.....	429	— List of Books, etc., relating to. By P. Lee Phillips, <i>noticed</i> .....	121
— Progress in.....	681	— First use of name on map....	206
— Northeast, Von Erlanger in... 363		— Greater. By A. R. Colquhoun, <i>noticed</i> .....	380
— Railroad, Cape to Cairo. 234,	680	— North. By I. C. Russell, <i>noticed</i> ..	702
— Railroad Development in. 540,	542	— Burnaby's Travels. <i>Reprint</i> , 1904, <i>noticed</i> .....	711
— South. Fruit sent to Great Britain.....	48	— Pioneer Spaniards in. By W. H. Johnson, <i>noticed</i> .....	253
— New Era in. By V. R. Markham, <i>noticed</i> .....	440	— South, Altitudes.....	610
— Rainfall in.....	543	— Exploration in.....	358
— Zwanzig Jahre in Süd-Afrika, von A. Einwald, <i>noticed</i> ..	717	American Geographical Society, Annual Report.....	61
Agriculture, Canaja, French.....	460	— BULLETIN to be a monthly.....	64
— Chile.....	10, 14	— Fiftieth Anniversary Dinner.....	784
— Copper River Country, Alaska. 753		— Hudson River Excursion.....	557
— Soils of Russia in Europe....	428	— Transactions, 61, 125, 191,	255
Alabama, Roads.....	734	— Intercontinental Route.....	469
Alaska, Arctic slope.....	407	Amphibious animal, unknown....	127
— Boundary. By G. Davidson, <i>noticed</i> .....	382	Anderson, J. G. C. <i>Studia Pontica</i> , <i>noticed</i> .....	780
— Tribunal, Questions Settled by the Award of the. By Robert Lansing.....	65	Andes, Along the. By A. Petrocokino, <i>noticed</i> .....	252
— Tribunal, Questions submitted to the.....	69	Andover Delta-Plain.....	162
— Colville River.....	404	André, Eugène, Naturalist in the Guianas, <i>noticed</i> .....	442
— Copper River Valley, Agriculture.....	753	Angola, Interior of.....	616
— John River.....	406	— South, Economic Resources .	93
— Mild Winter in.....	448	Annales de Géographie, Bibliographie, <i>noticed</i> .....	684
— Nome Placer beds.....	34		
— Northern, Mountains of.....	405		
— Reconnaissance in.....	403		
— Portland Channel.....	76		
— Seward Peninsula.....	35		
— Topographic Surveys, 1904, Notes on.....	699		

	PAGE		PAGE
Année Cartographique, <i>noticed</i> .....	60	Atlas, Stieler's, History of.....	264
Año Nuevo, Meteorological Sta- tion.....	91	— — — Parts, <i>noticed</i> , 106, 248, 556, 767	
Anschauliche Grundlagen der Mathe- matischen Erdkunde, u. s. w. Von K. Geissler, <i>noticed</i> .....	504	— — — United States Geologic, <i>noticed</i> , 104, 160, 173, 246, 297, 554	
Antarctic Expedition, British.....	546	— — — Statistical, <i>noticed</i> .....	60
— — — Return of the.....	293	— — — Topographic.....	676, 749
— — — Scottish.....	47, 489	— — — Economic value of.....	688
— — — Swedish, 1902-03.....	22	— — — of Volcanoes.....	436
— — — Pictures taken.....	285	— — — World, and Gazetteer, <i>noticed</i> .....	107
— — — Expeditions.....	95	Atmosphere, Earth's, History of the. By T. L. Phipson, <i>noticed</i> .....	568
— — — Gaussberg.....	559	Atmospheric pressure a climatic factor.....	96
— — — Ice in the. By H. Arctowski, <i>noticed</i> .....	51	Aus Deutsch-Brasilien. Von Alfred Funke, <i>noticed</i> .....	110
— — — Meteorology.....	547	Australia and England, Rainfall com- pared.....	50
— — — Résultats météorologi- ques de l'Hivernage de la "Bel- gica." Par H. Arctowski, <i>noticed</i> .....	509	— — — and Oceanica. By F. D. and A. J. Herbertson, <i>noticed</i> .....	112
— — — Scientific Station in the.....	172	— — — Interior of.....	762
Antarctic relieved by the Uruguay..	27	— — — Our Colonies, etc. By F. G. Carpenter, <i>noticed</i> .....	313
Anthropogeography, Helps to study.	548	Auswanderung der Chinesen, Die überseische. Von H. Gottwaldt, <i>noticed</i> .....	715
Apianus map, of 1520.....	210	Azov, Sea of, not drying up.....	46
Arabia, Climate of.....	487	Baedeker, Alps, Eastern, <i>noticed</i> ...	253
Ararat, Volcanic mountain.....	341	— — — Italy, Central, and Rome, <i>no- ticed</i> .....	253
Araucanians.....	12	— — — Italy from the Alps to Naples, <i>noticed</i> .....	778
Architecture in Khiva, Bokhara, &c., by O. Olufsen, <i>noticed</i> .....	573	— — — Norway, Sweden and Denmark, <i>noticed</i> .....	254
Arctic Expedition to observe radia- tion, &c.....	172	— — — United States, <i>noticed</i> .....	569
— — — Ziegler-Fiala.....	488	Bagirmi, Decadence of.....	771
— — — Four Years in the, "New Land," by Otto Sverdrup, <i>noticed</i> .....	774	Baikal, Lake, Railroad around.....	619
— — — Project of Prince of Monaco..	285	Baku.....	338
— — — Seas, Ice in the, 1903.....	171	Balch, E. S., American Explorers in Africa.....	186
— — — Slope, Alaska.....	407	— — — The Highest Mountain Ascent.	107
Arctowski, H. Ice in the Antarctic, <i>noticed</i> .....	51	Baltimore and Vicinity, Report on the Climate and Weather of. By O. L. Fassig, <i>noticed</i> .....	707
— — — Résultats météor. de l'Hiver- nage de la "Belgica," <i>noticed</i> .....	509	Bantu, Family the unit.....	410
Arnon Cliffs, Dead Sea.....	588	Barents Sea, Ice Conditions in..	488
Around the Caribbean and Across Panama. By F. C. Nicholas, <i>no- ticed</i> .....	112	Base Maps of the United States....	98
Artesian Water from Moraine.....	420	Bates, H. W., Letter to Chaillé- Long.....	351
Asia and America. Unity of race in tribes.....	42	Bathymetric Survey, New Zealand Lakes.....	620
— — — Central. Richesses Minérales des Possessions Russes en Asie Centrale. Par E.-D. Levat, <i>no- ticed</i> .....	778	Bayley, W. S., Monograph by, <i>no- ticed</i> .....	342
— — — Scientific Results of a Journey in. By Sven Hedin. Vol. I, <i>noticed</i> .....	780	Behaim Globe.....	197
— — — Eastern, climate of (War-field).	359	Beltrami, G. C., ecc. Per Eugenia Masi, <i>noticed</i> .....	380
Assal, Lake (East Africa).....	362	Benab, Shed, British Guiana.....	401
Assam-Bengal Railroad.....	759	Bénard, Charles. La Conquête du Pôle, <i>noticed</i> .....	572
Astronomical Triangle, etc. Mr. Littlehales' Solution of.....	299	— — — New Polar Project.....	490
Atlas, Année Cartographique, <i>noticed</i>	60	Bengal-Assam Railroad.....	759
— — — Russian Empire, climatologi- cal, <i>noticed</i> .....	439	Berber population, Tripoli.. 740, 741, 744	
		— — — Railroad to Suakin.....	483

	PAGE		PAGE
Berget, Alphonse. Physique du Globe et Météorologie, <i>noticed</i> ...	119	Brünn, Führer in das Höhlengebiet von. Von A. Makowsky und A. Rzehak, <i>noticed</i> .....	314
Bernier, Capt., S.S. Gauss, bought for.....	284	Bubonic Plague.....	286
Bibliographies, Critical, a desidera- tum.....	673	Burdick, Arthur J. Mystic Mid- region; the Deserts of the South- west, <i>noticed</i> .....	509
Bibliography, America, Central. P. Lee Phillips, <i>noticed</i> .....	121	Burnaby's Travels through North America. Reprint, R. R. Wilson, <i>noticed</i> .....	711
— Annual, of the <i>Annales de</i> <i>Géographie</i> , <i>noticed</i> .....	49, 684	Burton, A. R. E., Cape Colony for the Settler, <i>noticed</i> .....	251
— Bibliotheca Geographica, 1899, <i>noticed</i> .....	121	Cables, Ocean, 1903.....	47
— — 1900, <i>noticed</i> .....	549	Cady, Putnam. Historical and Phys- ical Geography of the Dead Sea Region.....	577
— Brazil, <i>noticed</i> .....	49	Calcutta, Population.....	409
— Chile, <i>noticed</i> .....	49	California, Climatology of. By Alex. G. McAdie, <i>noticed</i> .....	41
Bishop, Isabella. Obituary.....	765	— Rainfall and Crops in.....	277
Bizerte, Port of.....	283	Callirrhoe, Stream in Moab.....	587
Bojene, Fly fatal to cattle.....	770	Cambridge [England], Geography at.....	478
Bokhara, etc., Architecture in. By O. Olufsen, <i>noticed</i> .....	573	Campbell, Augusta M. Present-Day Japan, <i>noticed</i> .....	782
Bolivia-Brazil Boundary.....	215	Canada, Altitudes, Dictionary of... 231	
— Eastern, Rubber Districts.....	681	— Côte, River settlement.....	453
Book Notices..... 54, 109, 187, 248, 379, 440, 496, 564, 634, 701,	772	— French, Agriculture.....	460
Boqueron Bay, New harbor, Porto Rico.....	474	— — Family life.....	461
Borax, Chile.....	9	— — <i>Habitants</i> , Life of... 459-465	
Bordeaux, Albert. Rhodésie et Transvaal, <i>noticed</i> .....	575	— — Population.....	459
Bosnien und die Hercegovina, Geo- logischer Führer durch. Von F. Katzner, <i>noticed</i> .....	315	— Fur trade, Influence of.....	452
Boundary, Alaska. By G. Davidson, <i>noticed</i> .....	382	— Gouffre valley.....	456
— Brazil and Bolivia.....	215	— Immigration, 1903.....	282
— Congo-German East Africa... 429		— in Harvest Time, Through. By James Lumsden, <i>noticed</i> .....	252
— Mexican. Meanders and the... 598		— Land Grants, Original.....	453
Branner, John Casper, Stone Reefs of Brazil, <i>noticed</i> .....	497	— Riparian villages.....	454
Brasilien, Aus Deutsch. Von Alfred Funke, <i>noticed</i> .....	110	Canadian Northwest, Crops, 1903... 282	
Brazil-Bolivia Boundary.....	215	Canal, Barge, N. Y. State. By T. W. Symons.....	257
— Stone Reefs of. By J. C. Bran- ner, <i>noticed</i> .....	497	— — Water Supply.....	263
Brazilian Topographic Maps.....	167	— Morris, N. J., condemned.....	476
Bremischen Staate, Volkszählung im, <i>noticed</i> .....	441	— Panama, and the Sailing Ship.....	425
Brigham, Albert Perry. Good Roads in the United States.....	721	Canals, Ohio.....	752
British Antarctic Expedition.....	546	Canerio Marine Chart.....	201
— — Return of.....	293	Cannibals, French Congo.....	768-769
— Empire, Metric System in the... 128		Cantino World-Map.....	200
— Isles, Map of, Projection for. By C. F. Close, <i>noticed</i> .....	501	Cape Ann, Changes of Level at... 161	
— — Meteorological Aspects of Bird migration.....	237	— Colony for the Settler. By A. R. E. Burton, <i>noticed</i> .....	251
— — Rain, Distribution of, 1903. By H. R. Mill, <i>noticed</i> .....	564	— — Old. By Mrs. A. P. Trotter, <i>noticed</i> .....	311
— Nigeria. By A. F. Mockler- Ferryman, <i>noticed</i> .....	773	— to Cairo Railroad.....	234, 680
Brochner, Jessie. Danish Life in Town and Country, <i>noticed</i> .....	109	Caribbean, Around the, and across Panama. By F. C. Nicholas, <i>noticed</i> .....	112
		Carnegie Institution, Desert Botani- cal Laboratory.....	506
		Carpenter, Frank G. Australia, Our Colonies, etc., <i>noticed</i> .....	313
		— — Nathaniel, his Geography, 1625.....	359

	PAGE		PAGE
Cartography of the New World, Early, Waldseemüller and. By E. L. Stevenson.....	193	[Chinese Emigration]. Die über- seeische Auswanderung der Chi- nesen. Von H. Gottwaldt, <i>noticed</i> .....	715
Catalogue and Index, U. S. Geologi- cal Survey, <i>noted</i> .....	48	— in Mongolia.....	94
Caucasus, Coal Mines.....	337	— Map of the World, An Ancient, By H. B. Hulbert.....	600
— Ethnography.....	332	— Trade, Foreign ships in.....	47
— Mountains, Southern Russia and the. By E. O. Hovey.....	327	— Treaty Ports.....	432
— Oil-bearing strata of.....	338	Chisholm, Geo. G. Handbook of Commercial Geography, 4th Ed., <i>noticed</i> .....	113
Census. Bremischen Staate, Volks- zählung im, <i>noticed</i> .....	441	Chittenden, H. M. Yellowstone National Park, <i>noticed</i> .....	251
— England and Wales, 1901.....	444	Cinchona Tree in Java.....	685
Cervino, Monte. Guido Rey, <i>no- ticed</i> .....	503	Clarke, John M., succeeds Dr. Mer- rill as State Geologist of N. Y....	549
Ceylon, Topographical Surveys of..	544	Clements, J. M. Monograph by, <i>no- ticed</i> .....	81
Chad, Lake, Desiccation of.....	481	Climate and Atmospheric Pressure.....	96
— Exploration between Ubangi and.....	767	— Character in Scotland.....	479
— Lenfant's Boat Journey to.....	429	— the Cotton-Boll Weevil.....	96
— Waterway from, to the Atlantic.....	231	— Weather of Baltimore and Vicinity. Report by O. L. Fassig, <i>noticed</i> .....	707
Chagres River Basin, Rainfall in... 423		— Arabia.....	487
Chaillé-Long, Ch. Letter on the Uganda Protectorate and the Nile Quest ..	52	— Forests and.....	622
— State of Maryland votes medal to.....	192	— Nigeria, Northern.....	757
— Work on the Nile.....	346	— Panama.....	90
Chamberlin, Thomas C., and Salis- bury, R. D. Geology, <i>noticed</i> ...	305	— Persia.....	487
— Degree conferred.....	435	— Philippines.....	760
— Planetesimal Hypothesis.....	97	Climatic influence on Vineyards... 540	
Chekna, capital of Bagirmi.....	771	— peculiarity, Congo valley.... 757	
Chevalier Mission in the Shari Basin. 482, 767		Climatology, Africa, Observations of. 756	
Chile, Agriculture.....	10-14	— Klimatographie von Nieder- österreich, von J. Hann, <i>noticed</i> .. 569	
— an aristocracy.....	4	— of California. By Alex. G. McAdie, <i>noticed</i> .....	41
— Araucanians.....	12	Close, C. F. Projection for a Map of the British Isles on a scale of 1:1,000,000, <i>noticed</i> .....	501
— Borax supply.....	9	Coal Mines, Caucasus.....	330, 337
— Deserts.....	5	— resources of the Yukon.....	342
— Economic conditions and pros- pects.....	18	— United States, Production, 1903.....	610
— Geography of. By J. R. Smith.....	1	Coast and Geodetic Survey, U. S., Annual Report, 1903.....	228
— map of, <i>facing</i> .....	1	Coatzacoalcas, Mexican Port.....	537
— Guano.....	9	<i>Coffea excelsa</i> , new wild coffee.....	769
— Immigration.....	20	Coldest Region of the Earth.....	546
— Minerals.....	9	Coles and Cumberland Cos. (Illinois) compared.....	154
— Nitrates.....	6	Colima volcano.....	42
— Pastoral industries.....	15	Collier, Arthur J. Bulletin by, <i>no- ticed</i> .....	342
— Patagonian.....	15	Colonial Museum, German.....	358
— People of.....	3	Colorado, Hanging Valleys.....	536
— Population table.....	21	Colquhoun, Archibald R. Greater America, <i>noticed</i> .....	380
— Railways.....	19	Columbus, Birth of. Critical Study by Henry Vignaud, <i>noticed</i> .....	505
China, Geistige Strömungen im heu- tigen. Von O. Franke, <i>noticed</i> .... 718		Colville River, Alaska.....	404
— Past and Present. By E. Har- per, <i>noticed</i> .....	447	Commerce, Foreign, of Japan.....	682
— Yangtze, A Yankee on the. By W. E. Geil, <i>noticed</i> .....	716		

	PAGE		PAGE
Commerce, German, with Spain....	686	Congress, Geographic, Ninth Inter-	
— Geography of. By Spencer		national, to meet at Geneva.....	656
— Trotter, <i>noticed</i> .....	57	— Navigation, International As-	
Commercial Geography in the Uni-		sociation of.....	320
versity of Wisconsin.....	422	Conquête du Pôle, La. Par Charles	
— — of the World . . . By A.		Benard, <i>noticed</i> .....	572
J. Herbertson, <i>noticed</i> .....	113	Continental Nepeplain of N. E.	
— Readers, Pitman's, <i>noticed</i> ....	311	North America.....	159
Congo Basin, Sleeping Sickness....	755	Cook, Frederick A. Round Mount	
— Free State, Natives, Ethno-		McKinley.....	321
graphy of.....	679	— Joel. Switzerland Picturesque	
— — Railroads in.....	542	and Descriptive, <i>noticed</i> .....	717
— — White Population . . .	234	Copper River Valley, Alaska, Agri-	
— French, Administrative Divi-		culture.....	753
sions of the.....	169	Copra Trade, Guam.....	393
— Cannibal Tribes in.....	768-769	Cordier, Henri, presents medal to	
— Grass lands.....	768	Peary.....	693
— Native villages.....	771	Cornell Summer School of Geo-	
— Water systems formerly		graphy.....	292
extensive.....	772	Cornwall and Devon, North, Guide	
— German Boundary .....	429	<i>noticed</i> .....	254
— valley, climatic peculiarity....	757	Corthell, E. L., on Tampico Har-	
Congress, Geographic, Eighth Inter-		bour Works.....	423
national, 36, 125, 192, 255,		Cosa, Juan de la, Map of.....	198
320, 383, 510, 575, 638, 693.		Côte, River Settlement, Canada....	453
— — Announcement,		Cotton-Boll Weevil and Climate....	96
Preliminary.....	36	Coudreau, O. Voyages au Rio Cu-	
— Announcement of		ruá, La Mapuerá, au Maycurá,	
Programme.....	383, 511	<i>noticed</i> .....	701
— Attendance.....	511, 638	Courte, Le Comte de. La Nouvelle	
— Baltimore day		Zélande, <i>noticed</i> .....	778
abandoned.....	255	Coville, F. V., and Mac Dougal, D.	
— Hudson River Ex-		T. Desert Botanical Laboratory of	
cursion.....	557, 650	the Carnegie Institution, <i>noticed</i> ..	506
— Meetings, Account		Cox, Leonard M. Island of Guam. .	385
of.....	638-656	Crooks, J. J. History of the Colony	
— Meetings, New		of Sierra Leone, <i>noticed</i> .....	713
York.....	39, 126, 320, 510, 646	<i>Crystosphen</i> , Ice sheets buried in	
— Meetings, Philadel-		the Tundra.....	538
phia.....	645	Cullum Geog. Medal awarded to	
— Meetings, Wash-		Sven Hedín.....	255
ington.....	641	Cumberland and Coles Cos. (Illinois)	
— Meetings, Western		compared.....	154
— Peary R. E., chosen		— Road.....	721
President.....	192	Currents, Newfoundland Coast....	281
— Peary, R. E., clos-		Curuá, Rio, Voyage au. Par O. Cou-	
ing address by.....	651	dreau, <i>noticed</i> .....	701
— Peary, R. E., Medal		Cusplate Forelands, Origin of.....	279
presented to.....	693	Cyclones of the Far East. By José	
— Reception, Ameri-		Algué, <i>noticed</i> .....	705
can Geog. Society's.....	650	Damascus, Railroad to Mecca.....	484
— Reception by Mrs.		Danish Expedition, Greenland....	363
G. G. Hubbard.....	645	— Life in Town and Country.	
— Reception by Mr.		By Jessie Brochner, <i>noticed</i> .....	109
and Mrs. Peary.....	645	Daniel Gorge, Russia.....	333
— Reception, Mexico,		Darton, N. H. Report on Geology	
by President Diaz.....	656	of Nebraska, <i>noticed</i> .....	343
— Reception, Naval		Dauphiny, Glaciers.....	124
Observatory.....	644	Davidson, George. Alaska Bound-	
— Resolutions adop-		ary, <i>noticed</i> .....	382
ted.....	652	Da Vinci, Leonardo. Globe goes	
— Visits West Point.	650	ascribed to.....	213

	PAGE		PAGE
Davis, W. M. Hudson River Described.....	557	Eastern Uganda. By C. W. Hobley, <i>noticed</i> .....	120
— on the Essential in Geography.	470	Economic Development in Sechuan.	168
— Summer in Turkestan.....	217	— Geography of Chile. By J. R. Smith.....	1
Dead Sea Current along Moab Shore.	585	— Resources, South Angola....	93
— Trees growing in.....	584	Ecuador, Glaciers.....	43
— Region. Arnon Cliffs..	588	Egypt, Desert, Eastern.....	283
— Callirrhoe, stream.	587	— Irrigation.....	233
— Historical and Physical Geography of the. By Putnam Cady.....	577	— Seasons of crops.....	756
— Masada.....	582	Einwald, August. Zwanzig Jahre in Süd-Afrika, <i>noticed</i> .....	717
— Mashita, ruin.....	579	Eliot, Sir John. Temperature, Pressure, Wind, Humidity, etc., in India, <i>noticed</i> .....	572
— Oil from rocks....	585	Ellesmere Land defined.....	684
— Wady Môjib, cañon	587	Emmons, S. F., and Hayes, C. W. Contributions to Economic Geology, 1903, <i>noticed</i> .....	473
Death Gulch, Yellowstone Nat. Park.	278	England and Australia, Rainfall compared.....	50
Deep-Sea Soundings for Reed or Redfield Rocks.....	532-534	— and Wales, Census.....	444
Delta of Saint Clair River.....	80	English Colonies, Africa, Railroads in	541
— Plains of Nashua Valley, Mass.	475	English-Kikuyu Vocabulary. A. W. McGregor, <i>noticed</i> .....	712
Demtschinsky's long-range forecasts	50	Ensleme, H. À Travers la Mandchourie, <i>noticed</i> .....	712
Denmark, Norway, Sweden, and, Baedeker, <i>noticed</i> .....	254	Eritrea, Geografia della Colonia. Per A. Mulazzani, <i>noticed</i> .....	719
Dependitometer to measure the loss of heat.....	135	— Railroads in.....	542
Descriptive Geographies from Original Sources, Vol. 6 <i>noticed</i> .....	112	Erödi, Béla, on Geography in Hungary.....	697
Desert of Egypt, Eastern.....	283	Eskimos in Alaska.....	405
— of Sahara encroaching upon the Sudan.....	44	Espirito Santo, New Hebrides....	170
Deserts, Chile.....	5	Essential in Geography. Extracts from paper by W. M. Davis....	470
— United States.....	506	Essequibo River.....	397
— J. Burdick, <i>noticed</i> .....	509	Ethnography, Caucasus.....	332
Desiccation of Lake Chad.....	481	Europe, Historische Geographie von Mitteleuropa, von K. Kretschmer, <i>noticed</i> .....	779
Devadhunga, Nepalese mythological name.....	746	— Lake surveys.....	477
Development of Cut-off Meanders. By W. S. Tower.....	589	— Map-making in.....	683
Devon and Cornwall, North, Guide, <i>noticed</i> .....	254	Everest, Mount, is not Gaurisankar.	744
Dictionary, Geographical, Abbe's proposed.....	764	Évolution Comparée des Sables. Par J. Girard, <i>noticed</i> .....	315
Disproof of the Existence of Reed or Redfield Rocks. By G. W. Littlehales.....	530	Excavation of Herculaneum.....	288
Djéffara, plain, Tripoli.....	737	Expansion of Russia. By A. Rambaud, <i>noticed</i> .....	496
Dodge, Richard E. Elementary Geography, <i>noticed</i> .....	714	— — By F. H. Skrine, <i>noticed</i> .....	309
Dominica, Boiling Lake.....	424	Expedition to Tripoli. By the Vicomte de Mathuisieulx.....	736
Dubois, Marcel, et Kergomard, J. G. Précis de Géographie Économique, <i>noticed</i> .....	248	Exploration in South America....	358
Duff, H. L. Nyasaland under the Foreign Office, <i>noticed</i> .....	111	Fairchild, H. L. Le Conte's Geology, Revised, &c., <i>noticed</i> .....	118
Dunes, Sand, their control.....	43	— on Chamberlin's Planetesimal Hypothesis.....	97
— Tripolitan coast.....	737	Far East, Cyclones of the. By José Algué, <i>noticed</i> .....	705
Dutch Self-Taught. By C. A. Thimm, <i>noticed</i> .....	776	Farm lands, Value increased by good roads.....	725
Dutton, Clarence Edward. Earthquakes in the Light of the New Seismology, <i>noticed</i> .....	634		

	PAGE		PAGE
Fassig, Oliver L. Report on the Climate, &c., of Baltimore and Vicinity, <i>noticed</i> .....	707	Gauss, S.S., bought by Canada....	284
Fenn, G. Manville. The Khédive's Country, <i>noticed</i> .....	573	— in Canadian waters.....	448
Fetish, Its Relation to the Family. By R. H. Nassau.....	410	Gaussberg in the Antarctic.....	559
Finger Lake Valleys, Glacial Erosion in the.....	356	Gazetteer, Handy World Atlas and, <i>noticed</i> .....	107
Finland, Grand Duchy of. [By Isabella Mary Phibbs], <i>noticed</i> .....	182	Geil, Wm. Edgar. A Yankee on the Yangtze, <i>noticed</i> .....	716
Fischer, Jos. Discovery of Waldseemüller maps.....	205	Geissler, Kurt. Anschauliche Grundlagen der Mathematischen Erdkunde, u. s. w., <i>noticed</i> .....	504
— Theobald. Monograph on the Olive, <i>noticed</i> .....	763	Geistige Strömungen im heutigen China, von O. Franke, <i>noticed</i> ....	718
Fish, Remarkable, in the Mamun Lagoon.....	769	Geneva, Ninth Int. Geog. Congress to meet at.....	656
— Transplanting.....	491	Genthe, Martha Krug. Tribute to Friedrich Ratzel.....	550
Fisheries of Japan.....	687	Gentil, M., Commissioner of French Congo.....	245
Floods, Mississippi, 1903.....	353, 355	Geodetic Surveying, &c., in Madagascar, 1903. By W. H. Hunt..	561
— Nile.....	617	Geografia della Colonia Eritrea per A. Mulazzani, <i>noticed</i> .....	719
— Passaic River, 1902-03.....	352	Geographen-Kalender, <i>noticed</i> .....	442
Fogs, London.....	478	Geographers, Training of.....	674
Foreign Ships in Chinese trade....	47	Geographic Influence upon Human Affairs. By Geo. D. Hubbard... 145	
Forest Planting, Western Kansas... 753		— Names, U.S. Board on. 64, 637, 719	
Forestry. Iceland, Reforestation in. 538		Geographical and Topographical Terms, Glossary of. By A. Knox, <i>noticed</i> .....	713
Forests and Climate.....	622	— Dictionary, Abbe's proposed... 764	
— Rainfall, Hawaii.....	689	— Positions, Sextant Observations for Determining. By G. W. Littlehales.....	138
— Western U. S.....	39	— Record. 39, 89, 159, 230, 276, 352, 420, 474, 534, 608, 679, 752	
Fossil Topography.....	281	— Society, Lille.....	683
Foureau, F. Mission Saharienne Foureau-Lamy, 1 <sup>er</sup> Fasc., <i>noticed</i> ..	566	— Society of Philadelphia awards Kane medal to R. F. Scott.... 549	
— Mission, Scientific Results of the.....	482	— Surveying, Reeves's Notes on. By G. W. Littlehales.....	101
Fracture Valleys.....	280	Géographie Économique, Précis de. Par M. Dubois et J. G. Kergomard, <i>noticed</i> .....	248
Franke, O. Geistige Strömungen im heutigen China, <i>noticed</i> .....	718	Geographischer Anzeiger, <i>noticed</i> ... 242	
Franz Josef Land, <i>Frithjof</i> fails to reach.....	622	Geography at Cambridge [England]. — Ausgewählte Stücke . . . von O. Krümmel, <i>noticed</i> .....	478
French Colonies, Africa. Railroads in.....	541	— Carpenter's, 1625.....	359
— Exploration between the Ubangi and Lake Chad.....	767	— Commercial, Handbook of. Geo. G. Chisholm, 4th Ed., <i>noticed</i>	113
Freshfield, Douglas W. Round Kangchenjunga, <i>noticed</i> .....	115	— Neglected phase of. .... 240	
<i>Frithjof</i> , return of.....	622	— of the World . . . By A. J. Herbertson, <i>noticed</i> .....	113
Froidevaux, Henri. Paris Letter.. 122, 288		— Wisconsin University.....	422
Froley, J. W. Mr. Littlehales' Solution of the Astronomical Triangle, &c.....	299	— Dead Sea Region. By Putnam Cady.....	577
Führer in das Höhlengebiet von Brunn. Von A. Makowsky und A. Rzehak, <i>noticed</i> .....	314	— Definition of.....	662
Funke, Alfred. Aus Deutsch Brasilien, <i>noticed</i> .....	110	— Economic, of Chile. By J. R. Smith.....	I
<i>Funtumia elastica</i> , Indigenous rubber, Africa.....	768	— Elementary. By R. E. Dodge, <i>noticed</i> .....	714
Fur trade, Canada, Influence of.... 452			
Fyen, Island of, and its new seaport. Gargareeh, near Tripoli.....	737		
Gaurisankar is not Mount Everest.. 744			

	PAGE		PAGE
Geography, Essential in. Extracts from paper by W. M. Davis.....	470	Gibbons, A. St. H.... Africa from South to North through Marotse-land, <i>noticed</i> .....	570
— Europe. Historische Geo-graphie von Mitteleuropa. Von K. Kretschmer, <i>noticed</i> .....	779	Gilbert, G. K., Glaciers and Glacia-tion, <i>noticed</i> .....	187
— Evolutionary idea in.....	661	Gill, Sir David. Degree conferred.	435
— Hungarian Activity in.....	697	Girard, Jules. L'Évolution Com-parée des Sables, <i>noticed</i> .....	315
— Kant on Science of.....	660	Glacial Erosion in the Finger Lake Valleys.....	356
— Mathematical. Anschauliche Grundlagen der Mathematischen Erdkunde, u. s. w. Von K. Geissler, <i>noticed</i> .....	504	Glaciated Surfaces and Deposits in the Transvaal.....	480
— No <i>terra-incognita</i> in.....	663	Glaciation, Kern Basin, Cal.....	165
— of Commerce. By Spencer Trotter, <i>noticed</i> .....	57	— Tasmania.....	545
— Physical, New. By R. S. Tarr, <i>noticed</i> .....	113	Glacier Ice, Age of.....	763
— Physique du Globe et Mé-téorologie. Par A. Berget, <i>no-ticed</i> .....	119	— Muir, retreating.....	39
— Problem, Ultimate.....	673	— Riings.....	764
— Problems of, Present. By H. R. Mill.....	657	Glaciers and Glaciation. By G. K. Gilbert, <i>noticed</i> .....	187
— — — Two kinds.....	663	— Dauphny.....	124
— Ritter's Views on.....	660	— Ecuador.....	43
— Scheme of.....	239	— Savoy.....	124
— Should be Scientific.....	672	Glareanus, Maps of.....	208
— Summer School, Cornell.....	292	Gletscherkunde, von F. Machacek, <i>noticed</i> .....	190
— Surface relief in.....	662	Globe, Behaim.....	197
— Terminology required in.....	666	— gores ascribed to Da Vinci....	213
Geologic Atlas, U. S., <i>noticed</i> .....	104, 160, 173, 246, 297,	— Jagellon.....	212
Geological Survey, United States, Catalogue and Index, <i>noticed</i> ....	48	— Lenox.....	212
— — — — History of the..	357	— Schöner's, 1515.....	211
— — — — Publications, <i>no-ticed</i> .. 33-36, 81-83, 341-343, 357,	473, 605-608	Glossary of Geographical and Topo-graphical Terms. By A. Knox, <i>noticed</i> .....	713
— — — — Surveys, Notes on.....	29, 81	Gold Production in 1903.....	288
Geology. By Thos. C. Chamberlin and R. D. Salisbury, <i>noticed</i> ....	305	Gore Maps.....	207-208
— Economic, 1903. Emmons and Hayes, <i>noticed</i> .....	473	Gordon, General. Letters of... 350-351	
— Elements of. Le Conte's, re-vised by H. L. Fairchild, <i>noticed</i> .	118	Gottwaldt, H. Die überseeische Aus-wanderung der Chinesen, u. s. w., <i>noticed</i> .....	715
— Fracture Valleys.....	280	Gouffre Valley, Canada.....	456
— Guadeloupe.....	513	Graham, W. W., in the Himalayas..	107
— Interglacial period, Dr. Holst on.....	287	Grand Duchy of Finland [By I. M. Phibbs], <i>noticed</i> .....	121
Georgian Military Road, Russia....	332	Grande Soufrière of Guadeloupe. By E. O. Hovey.....	513
German Colonial Museum.....	358	Great Basin, Mountain Ranges of the.....	535
— Colonies, Africa, Railroads in..	541	Greater America. By A. R. Colqu-houn, <i>noticed</i> .....	380
— — — Das Überseeische Deutsch-land, <i>noticed</i> .....	777	Greenland Expedition, Danish Lit-erary.....	363
Germanus, Henricus Martellus. Map of.....	197	Gregory, J. W. Professor of Geol-ogy, University of Glasgow.....	549
Germany. Machines sent to the Tropics.....	687	Grenard, F. Le Tibet, <i>noticed</i> ....	566
— Trade with Spain.....	686	Grierson, P. J. Hamilton. The Silent Trade, <i>noticed</i> .....	710
Geschichte und Herkunft der schwei-zerischen Alpenflora. M. C. Je-roesch, <i>noticed</i> .....	709	Grindenwald, Pleasure-Book of. By D. P. Rhodes, <i>noticed</i> .....	110
		Grubb, W. Barbrooke. Among the Indians of the Paraguayan Chaco, <i>noticed</i> .....	444
		Guadeloupe, Geological Structure..	513

	PAGE		PAGE
Guadeloupe, Grande Soufrière of.		Hawaii, Forests and Rainfall.....	689
By E. O. Hovey.....	513	Hayes, C. W. and Emmons, S. F.	
— Mountains of.....	514	Contributions to Economic Geo-	
Guam, American Administration...	395	logy, 1903, <i>noticed</i> .....	473
— Area cultivated.....	393	Hedin, Sven, awarded medal by the	
— Climate.....	389	<i>Société de Géographie</i> .....	367
— Copra Trade.....	393	— awarded Cullum Geog.	
— Island of. By L. M. Cox.....	385	medal.....	255
— Natives.....	390-392	— Scientific Results, Cen-	
— Products.....	393	tral Asia, Vol. I., <i>noticed</i> .....	78c
— Schools.....	395	Heilprin, Angelo. Appointment,	
— Spanish Administration.....	394	Yale University.....	435
— Timber.....	388	Herbertson, A. J. Commercial Geo-	
Guano, Chile.....	9	graphy of the World... <i>noticed</i> ...	113
Guide, Alps, Eastern, <i>noticed</i> .....	253	— and F. D. Australia and	
— Devon and Cornwall, North,		Oceanica, <i>noticed</i> .....	112
<i>noticed</i> .....	254	Herculaneum, Excavation of.....	288
— Italy, Central, and Rome, <i>no-</i>		Highest Mountain Ascent. E. S.	
<i>ticed</i> .....	253	Balch.....	107
— from the Alps to Naples,		Hill, A. W., describes plants near	
<i>noticed</i> .....	778	Lake Titicaca.....	754
— Jamaica, 1903, <i>noticed</i> .....	110	— Robert T., in Mexico.....	536
— Madagascar et Dépendances,		Himalayan peaks, Identification of..	744
<i>noticed</i> .....	111	Himalayas, Ascents by Dr. and	
— Norway, Sweden and Denmark,		Mrs. Workman.....	51
<i>noticed</i> .....	254	Historic Highways of America. By	
— United States, <i>noticed</i> .....	569	A. B. Hulbert, <i>noticed</i> .....	54
Guiana, British, River Names of. By		Historische Geographie von Mittel-	
J. Rodway.....	396	europa. Von K. Kretschmer, <i>no-</i>	
— "Timehri," Rock pic-		<i>ticed</i> .....	779
tures.....	397	History of the Colony of Sierra	
Guianas, Naturalist in the. By Eu-		Leone. By J. J. Crooks, <i>noticed</i> ...	713
gène André, <i>noticed</i> .....	442	Hitchcock, Ripley. Louisiana Pur-	
Guinea. Nuestras Colonias en. Por		chase, etc., <i>noticed</i> .....	383
F. Montaldo, <i>noticed</i> .....	379	Hobley, C. W. Eastern Uganda,	
Haack, Hermann. Geographien-		<i>noticed</i> .....	121
Kalender, <i>noticed</i> .....	442	Holmes, W. H., Aboriginal Pottery	
Haas, Hippolyt. Neapel, seine Um-		of the Eastern United States, <i>Note</i>	
gebung und Sizilien, <i>noticed</i> ...	249	<i>on</i> .....	269
Halfa, shipped for paper mills....	736	Honduras. Edited by A. K. Moe,	
Hamilton, Angus. Korea, <i>noticed</i> ...	314	<i>noticed</i> .....	777
Hamy, E. T. Monograph on Le-		Hovey, Edmund Otis. Grande Souf-	
sueur's Travels, <i>noticed</i> .....	608	rière of Guadeloupe.....	513
Handbook for Jamaica, 1903, <i>no-</i>		— Southern Russia and	
<i>ticed</i> .....	110	the Caucasus Mountains.....	327
— of Commercial Geography, Geo.		Hubbard, Geo. D. Geographic In-	
G. Chisholm. 4th Ed., <i>noticed</i> ...	113	fluence upon Human Affairs....	145
Hanging Valleys.....	422	Hudson River Described by W. M.	
— Colorado.....	536	Davis.....	557
Hann, Julius, Honorary Member		Hulbert, Archer Butler. Historic	
Russian Geog. Society.....	549	Highways of America, <i>noticed</i> ...	54
— Klimatographie von Nieder-		— H. B. An Ancient (Chinese)	
österreich, <i>noticed</i> .....	569	Map of the World.....	600
Harper, Edward. China, Past and		— and Vanderlip, W. B.	
Present, <i>noticed</i> .....	447	In Search of a Siberian Klondike,	
Harriman Alaska Expedition. Vol. 3,		<i>noticed</i> .....	249
<i>noticed</i> .....	187	Human Affairs, Geographic In-	
Hartleben's Kleines Statistisches		fluence upon. By Geo. D. Hubbard.	145
Taschenbuch. F. Umlauf, <i>no-</i>		Hungary, Geography in.....	697
<i>ticed</i> .....	570	Hunt, William H. Geodetic Sur-	
Haushofer, Max. Tirol und Vorarl-		veying, Topographical Work, and	
berg, <i>noticed</i> .....	109	Map-making in Madagascar, 1903.	561

	PAGE		PAGE
Hutter, Franz. Wanderungen und Forschungen im Nord-Hinterland von Kamerun, <i>noticed</i> .....	382	Jerosch, Marie Ch. Geschichte und Herkunft der schweizerischen Alpenflora, <i>noticed</i> .....	709
Ice Conditions, Barents Sea.....	488	John River, Alaska.....	406
— in the Arctic Seas, 1903.....	171	Johnson, W. A. Pioneer Spaniards in North America, <i>noticed</i> .....	253
— Sheets buried in the Tundra.....	538	Kamerun. Wanderungen in. Von F. Hutter, <i>noticed</i> .....	382
Iceland, Reforestation in.....	538	Kangchenjunga, Round. By D. W. Freshfield, <i>noticed</i> .....	115
— Weather and that of N. W. Europe.....	91	Kano [Sudan], Picture of.....	157
Idaho, Geology, etc., of.....	82-83	Kansas, Forest Planting in Western.	753
Illinois Roads.....	734	Kant, Immanuel, on geography....	660
Immigration, Chile.....	20	Katanga, Navigation in.....	234
Impérialisme allemand. Par Maurice Lair, <i>noticed</i> .....	441	— Progress in.....	613
Inde d'aujourd'hui. Par Albert Métin, <i>noticed</i> .....	444	— Sleeping Sickness in.....	615
India, Irrigation.....	359	Katzer, Friedrich. Geologischer Führer durch Bosnien und die Hercegovina, <i>noticed</i> .....	315
— Population of.....	408-410	Kennedy, E. B. Thirty Seasons in Scandinavia, <i>noticed</i> .....	312
— Rainfall and Population.....	488	Kergomard, J. G. et Dubois, Marcel. Précis de Géographie Economique, <i>noticed</i> .....	248
— Religions.....	409	Kern Basin, California.....	164
— Temperature, Pressure, Wind, Humidity, etc., in. By Sir J. Elliot, <i>noticed</i> .....	572	Kernbut, a new term.....	243
Indiana Geological Survey.....	31	Kerncol, a new term.....	243
Indians of the Paraguayan Chaco. By W. B. Grubb, <i>noticed</i> .....	444	Khedive's Country. By G. M. Fenn, <i>noticed</i> .....	573
Influence of Geographic Environment on the Lower St. Lawrence. By E. C. Semple.....	449	Khiva, etc. Architecture in. By O. Olufsen, <i>noticed</i> .....	573
Influenza, Sunshine and.....	539	Khoms, Tripolitan port.....	736
Intercontinental Route, American.....	469	Kilimanjaro ascended by C. Uhlig..	754
Interglacial Gorge Problem.....	357	Kingsley, Mary H., <i>quoted</i> .....	418
— period, Concerning the.....	287	Klimatographie von Niederösterreich, von J. Hann, <i>noticed</i> .....	569
Iowa Geological Survey.....	32	Knox, Alexander. Glossary of Geographical and Topographical Terms, <i>noticed</i> .....	713
— Roads in.....	722	Koch, Robert.....	245
Irrigation, Egypt.....	233	Korea. By Angus Hamilton, <i>noticed</i> .....	314
— in India.....	359	Kretschmer, Konrad. Historische Geographie von Mitteleuropa, <i>noticed</i> .....	779
Island of Guam. By L. M. Cox.....	385	Krümmel, O. Ausgewählte Stücke der Geographie, <i>noticed</i> .....	189
Ismailia, Mosquitoes in.....	242	Kumassi, Ashanti. Railroad to.....	44
Italian Travel, Book of. By H. N. Maughan, <i>noticed</i> .....	565	Kupczanko, Gregor Iw. Russland in Zahlen, <i>noticed</i> .....	110
Italy, Central, and Rome. Baedeker, <i>noticed</i> .....	253	Lair, Maurice. L'Impérialisme allemand, <i>noticed</i> .....	441
— from the Alps to Naples. Baedeker, <i>noticed</i> .....	778	Lake, Boiling, Dominica.....	424
Jagellon Globe.....	212	Lakes, European.....	477
Jamaica, Handbook for 1903, <i>noticed</i> .....	110	— New Zealand, Survey of.....	620
Jannasch, R. Die Wege und Entfernungen zur See im Welt-Verkehr, <i>noticed</i> .....	311	— Scottish, Surveys of.....	91
Japan. Die Entwicklung Japans, u. s. w. Von O. Nippold, <i>noticed</i> .....	778	Landslide on Turtle Mountain....	272
— Fisheries of.....	687	Lansing, Robert. Questions Settled by the Award of the Alaskan Boundary Tribunal.....	65
— Foreign Commerce.....	682	Lapland, Health Resort in.....	286
— Present-Day. By A. M. Campbell, <i>noticed</i> .....	782	Laurentian Mountains.....	455
— To-Day. By J. A. B. Scherer, <i>noticed</i> .....	446		
— von Joseph Lauterer, <i>noticed</i> .....	574		
Japanese Grammar Self-Taught. By H. J. Weintz, <i>noticed</i> .....	776		
Java, Cinchona tree in.....	685		

# Index.

795

	PAGE		PAGE
Laussedat, A. Recherches sur les Instruments, les Méthodes et le Dessin Topographiques, <i>noticed</i> ..	499	Main River Basin, Germany. Precipitation and Flow.....	237
Lauterer, Joseph. Japan, <i>noticed</i> ..	574	Makarov, Admiral. Obituary.....	435
Le Conte, Joseph. Elements of Geology, Revised by H. L. Fairchild, <i>noticed</i> .....	118	Makowsky, A., und Rzehak, A. Führer in das Höhlengebiet von Brünn, <i>noticed</i> .....	314
Leith, C. K. Monograph by, <i>noticed</i> .....	82	Malanda, Family "medicine"....	415
Le Jolis, A. F. Obituary.....	638	Mamun marshes really a plain....	769
Lenfant, Captain, Gold medal conferred upon.....	367	Mandchourie, A travers la. Par H. Enselman, <i>noticed</i> .....	712
— Voyages to Lake Chad.....	429	Map, British Isles, Projection for. By C. F. Close.....	501
Lenox Globe.....	212	— -making in Europe.....	683
Leptis Magna, Tripoli.....	737	— -making, Madagascar.....	561
Lesueur, Charles Alexandre. Travels in the U. S.....	608	— Mercator, 1538.....	215
Levat, E.-D. Richesses Minérales des Possessions Russes en Asie Centrale, <i>noticed</i> .....	778	— World, Ancient Chinese. By H. B. Hulbert. With Reproduction and Index key.....	600-605
Lhassa, Zybikov's visit to.....	95	Maps, Gore.....	207-208
Library, Accessions.....	177, 371, 623	Maps, <i>noticed</i> , 60, 103, 172, 246, 295, 368, 436, 492, 554, 632, 694, 765	
Lille Geographical Society.....	683	— — AFRICA:	
Limnology in Europe.....	477	— — — Angola.....	246
Lindenköhl, Adolph. Obituary....	435	— — — Borgu.....	696
Lisière, Alaska.....	66	— — — Central and South.....	370
Littlehales, G. W. Disproof of the Existence of Reed or Redfield Rocks.....	530	— — — German East.....	493
— Concerning Sextant Observations for Determining Geographical Positions.....	138	— — — German East, Economic.....	366
— Reeves's Notes, etc., on Geographical Surveying.....	101	— — — German East, Railroad.....	174
— Solution of the Astronomical Triangle, etc. Abstract by J. W. Froley.....	299	— — — German Southwest.....	174
London Fogs.....	478	— — — Kamerun, Central.....	61
Louisiana Purchase, etc. By R. Hitchcock, <i>noticed</i> .....	383	— — — Kamerun, General.....	369
Lugard, Sir F. Picture of Kano... 157		— — — Kamerun, Hutter's route.....	369
Lumsden, James. Through Canada in Harvest Time, <i>noticed</i> .....	252	— — — Kavirondo.....	174
McAdie, Alex. G. Climatology of California, <i>noticed</i> .....	41	— — — Madagascar, Missions.....	369
MacClintock, Samuel. The Philippines, <i>noticed</i> .....	304	— — — Mission.....	493
MacDougal, D. T., and Coville, F. V. Desert Botanical Laboratory of the Carnegie Institution, <i>noticed</i> .....	506	— — — Morocco, Flotte de Roquevaire's.....	696
McGregor, A. W. English-Kikuyu Vocabulary, <i>noticed</i> .....	712	— — — Morocco, Graf von Pfeil's.....	246
Machacek, F., Gletscherkunde, <i>noticed</i> .....	190	— — — Natal Mining Districts.....	299
McKinley, Mount. By F. A. Cook. Madagascar et Dépendances, Guide Annuel de, <i>noticed</i> .....	321	— — — Niger - Bénoué - Tchad.....	438
— Geodetic Surveying, etc., 1903. By W. H. Hunt.....	561	— — — Nigeria, Northern.....	106
— Thirty Years in. By T. T. Matthews, <i>noticed</i> .....	783	— — — Political.....	438
		— — — Railroad.....	438
		— — — Rhodesia, Geologic.....	493
		— — — Rhodesia, Railroad.....	633
		— — — Shire River.....	106
		— — — Sierra Leone-Liberian Boundary.....	696
		— — — Togo, Boundaries.....	633
		— — AMERICA:	
		— — — Alabama, Geologic.....	554
		— — — Alaska, Boundary.....	368
		— — — Alaska, General chart.....	554

	PAGE		PAGE
Maps, noticed, AMERICA:		Maps, noticed, AMERICA:	
— Alaska Telegraph		— Nottaway River	
and Cable System.....	694	— Basin, Quebec.....	766
— Alaska, Topogra-		— Panama Canal.....	492
phic.....	295	— Passaic Valley....	368
— Alaska, York Re-		— Patagonia.....	104
gion.....	492	— Piedmont Plateau	
— Alaska, Yukon		(U.S.).....	104
River.....	172	— Porto Rico, Min-	
— Argentina Hydro-		ing.....	436, 492
graphic Charts.....	246	— Salvador, Sapper's.	695
— Athabaska, Canada,		— Saramacca River,	
Geologic.....	766	Dutch Guiana.....	766
— Atlin Gold Fields,		— Saskatchewan, Can-	
B. C.....	765	ada, Geologic.....	766
— Bolivia.....	695	— Titicaca, Lake....	695
— Bolivia, Northern.	104	— United States,	
— Brazil, Southern,		Gypsum Deposits.....	368
Rainfall.....	298	— United States,	
— Brazil, Topogra-		Ports.....	296
phic.....	167	— United States, Vi-	
— Buenos Aires, Geo-		vien de St. Martin's.....	440
logic.....	369	— — — — —	
— Buenos Aires, Plan.	436	— — — — —	
— Canada, N. W.,		— — — — —	
Mounted Police Stations.....	555	— — — — —	
— Canada, Ports....	296	— — — — —	
— Canada, Railroad.	555	— — — — —	
— Canada, Topogra-		— — — — —	
phic (Windsor Sheet).....	555	— — — — —	
— Canada, West, Geo-		— — — — —	
logic.....	296	— — — — —	
— Canandaigua, N. Y.,		— — — — —	
Stratigraphic.....	695	— — — — —	
— Cau polican and		— — — — —	
Northern Bolivia.....	104	— — — — —	
— Caura River, Vene-		— — — — —	
zuela.....	437	— — — — —	
— Guatemala, West.		— — — — —	
Sapper's.....	695	— — — — —	
— Hualgayoc, Peru..	436	— — — — —	
— Hudson and James		— — — — —	
Bays, East Coast Geologic.....	765	— — — — —	
— Indiana, Geologic.	555	— — — — —	
— Keewatin, Canada,		— — — — —	
Geologic.....	766	— — — — —	
— Magallanes, Land of	172	— — — — —	
— Magellan Strait..	632	— — — — —	
— Minnesota Vermil-		— — — — —	
ion Iron-Bearing District.....	103	— — — — —	
— Mocha Island, Chile	555	— — — — —	
— Naples, N. Y., Strat-		— — — — —	
igraphic.....	695	— — — — —	
— Nevada.....	173	— — — — —	
— New Jersey, Cen-		— — — — —	
tral Basin.....	368	— — — — —	
— New Jersey, Clays.	632	— — — — —	
— New York State		— — — — —	
Drainage.....	368	— — — — —	
— Nicaragua.....	492	— — — — —	
— North America,		— — — — —	
from Sohr-Berghaus Handatlas..	103	— — — — —	

	PAGE		PAGE
Maps, <i>noticed</i> , ASIA:		Maps, <i>noticed</i> , WORLD:	
— — — Kamchatka, Geo-		— — — Coaling Stations of	
— — — logic and Topographic.....	298	— — — Great Britain and the U. S.....	633
— — — Lhasa, Plan.....	176	— — — Cotton-Growing	
— — — Orographic, by		— — — areas.....	556
— — — Prince Kropotkin.....	105	— — — Earthquakes at Sea.	633
— — — Philippines (Census		— — — showing German Ex-	
— — — Bulletin Maps).....	494	— — — pansion in.....	697
— — — Physical.....	494	— — — showing vegetation.....	96
— — — Shantung and N.		— — — United States Base.....	98
— — — Kiangsu.....	494	— — — Waldseemüller, Discovery of,	
— — — Stanford's.....	175	— — — by Prof. Fischer.....	205
— — — Siam-Cochin China	437	— — — World, Address on, by E. L.	
— — — Tibet, South Cen-		— — — Stevenson.....	193, 215
— — — tral.....	437	— — — Mapuerá, Voyage à La. Par O.	
— — — AUSTRALASIA:		— — — Coudreau, <i>noticed</i> .....	701
— — — Australia, locating		— — — Marcus Island.....	544
— — — Aborigines.....	439	— — — Markham, Violet R. New Era in	
— — — Kaiser Wilhelm		— — — South Africa, <i>noticed</i> .....	440
— — — Land.....	439	— — — Maryland Geological Survey.....	31
— — — New Guinea, Brit-		— — — Masada, Judea.....	582
— — — ish.....	106	— — — Mashita, ruin in Moab.....	579
— — — EUROPE:		— — — Masi, Eugenia. Giacomo C. Bel-	
— — — Austria-Hungary..	173	— — — trami e le sue Esplorazioni in	
— — — Balkan Peninsula.	247	— — — America, <i>noticed</i> .....	380
— — — Barents Sea.....	176	— — — Massachusetts, Roads.....	732
— — — Boulogne-sur-Mer.	173	— — — Mathuisieulx, Vicomte de. An Ex-	
— — — Brandenburg, Iso-		— — — pedition to Tripoli.....	736
— — — chronic.....	104	— — — [Matterhorn.] Il Monte Cervino,	
— — — Budapest.....	61	— — — Guido Rey, <i>noticed</i> .....	503
— — — Dolomiten.....	247	— — — Matthews, T. T. Thirty Years in	
— — — Douro, Porto do....	370	— — — Madagascar, <i>noticed</i> .....	783
— — — Emden en Delfzijl.	174	— — — Maughan, H. N. Book of Italian	
— — — England and Wales.	494	— — — Travel, <i>noticed</i> .....	565
— — — England, Ordnance		— — — Maycurd, Voyage au. Par O. Cou-	
— — — Survey.....	479	— — — dreau, <i>noticed</i> .....	701
— — — England, Vegetation		— — — Mbati, Family "medicine".....	418
— — — of River Basins.....	173, 696	— — — rite.....	420
— — — Finland, Geologic..	248	— — — Meakin, Annette M. B. In Russian-	
— — — Forth Valley, Indus-		— — — Turkestan, <i>noticed</i> .....	312
— — — trial.....	105	— — — Meanders and the Mexican Boundary	
— — — France, New.....	480	— — — Question.....	598
— — — Shipping disasters..	632	— — — Meanders, Cut-off. Deflection of	
— — — Italy, Railroad.....	556	— — — current.....	595
— — — Lissa and Busi Is-		— — — Development of. By W.	
— — — lands.....	437	— — — S. Tower.....	589
— — — London, Geologic..	358	— — — Formation and changes..	592
— — — Mediterranean Olive		— — — Growth of.....	591
— — — Lands.....	495, 766	— — — Incised.....	590
— — — Newa Bucht.....	105	— — — River, <i>figures</i> .....	590, 592, 594
— — — Rome (Istituto Geo-		— — — Mecca, Railroad to Damascus.....	484
— — — grafico Italiano).....	555	— — — [Mediterranean Lands.] Das Mit-	
— — — Rügen, Island of... 495		— — — telmeergebiet, von A. Philippson,	
— — — Russian Empire.... 174		— — — <i>noticed</i> .....	779
— — — Scotland, Lochs of.		— — — Medusæ in Victoria Nyanza.....	93
— — — 298, 556, 766		— — — Menominee Iron-Bearing District of	
— — — Switzerland.....	495	— — — Michigan.....	342
— — — Supplement-maps, Geo-		— — — Mercator map of 1538.....	215
— — — graphen-Kalender.....	371	— — — Merrill, F. J. H., State Geologist of	
		— — — N. Y., retired.....	549
		— — — Mesabi Iron-Bearing District of Min-	
		— — — nesota.....	82

	PAGE		PAGE
Meteorological Aspects of Bird Migration, British Isles.....	237	Mountain Ranges of the Great Basin.....	535
— Service, Transvaal.....	543, 758	Mountains, Guadeloupe.....	514
— Station, Año Nuevo Island.....	91	— Ruwenzori Range, Uganda... ..	542
Meteorology, Antarctic.....	547	Mozambique, Le. Par A. Negreiros, <i>noticed</i> .....	712
— Résultats météorologiques de l'Hivernage de la "Belgica." Par H. Arctowski, <i>noticed</i> .....	509	Mud Islands at Walfish Bay.....	362
— Condensation, Table Mountain.....	236	Muir Glacier retreating.....	39
— India, Meteorological Memoir. By Sir John Eliot, <i>noticed</i> .....	572	Mulazzani, A. Geografia della Colonia Eritrea, <i>noticed</i> .....	719
— Precipitation, etc., Main River, Germany.....	237	Mullins, J. D., Wonderful Story of Uganda, <i>noticed</i> .....	496
— Soufrière of Guadeloupe.....	516	Murray, Sir John. Degree conferred.....	435
Métin, Albert. L'Inde d'aujourd'hui, <i>noticed</i> .....	444	Mystic Mid-region; Deserts of the Southwest [U. S.]. By A. J. Burdick, <i>noticed</i> .....	509
Metric System in the British Empire.....	128	Nashua Valley, Mass., Delta Plain of Nassau, R. H. Fetish: Its Relation to the Family.....	410
Mexican Boundary Question, Meanders and.....	598	National Good Roads Association, St. Louis.....	728
Mexico, Altitudes.....	610	Natural Bridges of Utah.....	534
— Coatzacoalcas.....	537	Naturalist in the Guianas. By Eugène André, <i>noticed</i> .....	442
— Quer durch Mexiko, von W. Schiess, <i>noticed</i> .....	718	Navigation in Katanga.....	234
— Robert T. Hill in.....	536	Neapel, seine Umgebung und Sizilien. Von H. Haas, <i>noticed</i> .....	249
— Salina Cruz.....	537	Nebraska Geological Survey.....	30
Michigan, Menominee Iron-Bearing District.....	342	— Geology, etc., of. Report <i>noticed</i> .....	343
Mill, Hugh Robert. Distribution of Rain over the British Isles, 1903, <i>noticed</i> .....	564	Neger, F. W. und Vanino, L. Der Paraguay-TEE (Verba-Mate), <i>noticed</i> .....	310
— Present Problems of Geography.....	657	Negreiros, Almada. Le Mozambique, <i>noticed</i> .....	712
Mimir, Icelandic publication, <i>noticed</i> .....	192	Negroes in the U. S.....	609
Minerals, Chile.....	9	Newfoundland, Currents, S. E. Coasts of.....	281
Mineral Springs, Russian.....	330	New Era in South Africa. By V. R. Markham, <i>noticed</i> .....	440
Minnesota, Mesabi Iron-Bearing District.....	82	— Guinea, British. Natives who can scarcely walk.....	691
— Vermilion Iron-Bearing District.....	81	— Hebrides, Largest Island of the — Jersey Roads, "State aid" plan — Land: Four Years in the Arctic. By Otto Sverdrup, <i>noticed</i> .....	774
Mission Saharienne Foureau Lamy. Par F. Foureau, 1er Fasc., <i>noticed</i> .....	566	— Maps. 60, 103, 172, 246, 295, 368, 436, 492, 554, 632, 694, — Physical Geography. By R. S. Tarr, <i>noticed</i> .....	113
Mississippi Floods, 1903.....	353	— York City, changes in elevation — State Canal, Barge, Projected. By T. W. Symons.....	257
Mittelmeergebiet, Das, von A. Philippson, <i>noticed</i> .....	779	— Farm Property, Decrease in value of.....	723
Mockler-Ferryman, A. F. British Nigeria, <i>noticed</i> .....	773	— Natural History Survey, Index, <i>noticed</i> .....	48
Moe, Alfred K. Honduras, <i>noticed</i> .....	777	— Roads.....	732-733
Mohn, H. Degree conferred.....	435	New Zealand Lakes, Bathymetric Survey.....	620
Monaco, Prince of. Arctic Project.....	285	— Year Book for 1903.....	621
Monadnock, Mount.....	163	News, Notes and.....	63, 125, 191, 255, 320, 383, 448, 510, 575, 637, 719, 784
Mongolia, Chinese in.....	94		
Montaldo, Federico. Nuestras Colonias en Guinea, <i>noticed</i> .....	379		
Monte Rosa, Observatory on.....	428		
Moraine, Shelbyville.....	147		
Morocco, Zkara, a Christian Tribe in, — Morris Canal, N. J., condemned.....	343		
— Mosquito, Yellow Fever, Distribution of.....	242		
Mosquitoes, Ismailia.....	242		
Mountain Ascent, Highest. E. S. Balch.....	107		

	PAGE		PAGE
Nicholas, Francis C. Around the Caribbean and across Panama, <i>noticed</i> .....	112	Ohio Canals.....	752
Nichols, Francis H., at Tengyueh.....	384	Oil Fields, Caucasus.....	338
— Communications received.....	575	Old Cape Colony. By Mrs. A. P. Trotter, <i>noticed</i> .....	311
— in India.....	719	Olive, Monograph by T. Fischer, <i>noticed</i> .....	763
— in Tibet.....	637	— plantations, Tripoli.....	742
Nigeria, British. By A. F. Mockler-Ferryman, <i>noticed</i> .....	773	Olufsen, O. Old and New Architecture in Khiva, Bokhara and Turkestan, <i>noticed</i> .....	573
— Northern, Climate of.....	757	Oregon, Geology of.....	83
— Surveys in.....	169	Oroya, Peru.....	749
Nile, Chaillé-Long's Work on the.....	346	Pacific Ocean, Dangerous Rocks in.....	530
— Floods.....	617	— South, Fish transplanting to.....	491
— Quest, Uganda Protectorate and the.....	52	Panama, Around the Caribbean and across. By F. C. Nicholas, <i>noticed</i> .....	112
— Valley and Its Products. The Khedive's Country. G. M. Fenn, <i>noticed</i> .....	573	— Canal and the Sailing Ship.....	425
Nippold, Otfried. Die Entwicklung Japans in den letzten fünfzig Jahren, <i>noticed</i> .....	778	— Climate.....	90
Nitrates, Chile.....	6	Pan-American Railway.....	89, 466
Nome, Cape. Placer beds.....	34	Paraguayan Chaco, Indians of the. By W. B. Grubb, <i>noticed</i> .....	444
Nootka, Vancouver and Quadra Monument.....	126	Paraguay-Tee (Yerba Mate). Von F. W. Neger und L. Vanino, <i>noticed</i> .....	310
Nordstrand, Schleswig - Holstein, joined to the mainland.....	539	"Park of Peace," Victoria Falls.....	758
North Carolina Roads.....	734	Paris Letter.....	122, 288
— Road-tax.....	723	— Société de Géographie, Awards medals. By F. C. Nicholas, <i>noticed</i> .....	367
— Pole, Indications of Land near Sea, Winning land from the.....	539	Passaic River Floods, 1902-03.....	352
Norway, Sweden, etc. Baedeker, <i>noticed</i> .....	254	Patagonian Chile.....	15
Notes and News. 63, 125, 191, 255, 320, 383, 448, 510, 575, 637, 719, 784.....	81	Peary, R. E. Medal awarded by the Société de Géographie, Paris.....	448, 693
— on Geological Surveys.....	29, 81	— New Arctic ship described.....	694
Notices, Book. 54, 109, 187, 248, 304, 379, 449, 496, 564, 634, 701, 772.....	778	— President Eighth Int. Geo. Congress.....	192
Nouvelle Zélande, La. Par Le Comte de Courte, <i>noticed</i> .....	778	<i>Peldliths</i> .....	287
Nuestras Colonias en Guinea. Por F. Montaldo, <i>noticed</i> .....	379	Peneplain, Continental, of N. E. North America.....	159
Nyasaland under the Foreign Office. By H. L. Duff, <i>noticed</i> .....	111	Pennsylvania Roads.....	734
Ober, Frederick A. Our West Indian Neighbors, <i>noticed</i> .....	776	Persia, Climate.....	487
Obituary. Bishop, Isabella.....	765	Peru, "Central Route of".....	747
— Le Jolis, Auguste François.....	638	— Coast valleys.....	747
— Lindenkohl, Adolph.....	435	— Trans-Andean route in.....	747
— Makarov, Admiral.....	435	Peters, W. J. Reconnaissance in Alaska.....	403
— Ratzel, Friedrich.....	550	Petrocokino, A. Along the Andes, <i>noticed</i> .....	252
— Ruge, Sophus.....	64, 241	[Phibbs, Isabella Mary.] Grand Duchy of Finland, <i>noticed</i> .....	121
— Sowerbutts, Eli.....	435	Philippines and the Far East. By H. C. Stuntz, <i>noticed</i> .....	250
— Stanley, Henry M.....	302	— Climate.....	760
— Von Zittel, Karl Alfred.....	367	— Population.....	430
— Wilhelm, Leopold.....	64	— The. By Samuel MacClintock, <i>noticed</i> .....	304
Observatory on Monte Rosa.....	428	— Typhoon of Oct., 1903.....	485
Ocean Cables, 1903.....	47	Phillips, P. Lee. List of Books, Magazine Articles and Maps relating to Central America, <i>noticed</i> .....	121
Oceanica, Australia and. By F. D. & A. J. Herbertson, <i>noticed</i> .....	112	Philippson, A. Das Mittelmeergebiet, <i>noticed</i> .....	779
— dense, a Seaport.....	762	— to go to Asia-Minor.....	245
— ea, modern Tripoli.....	737		

	PAGE		PAGE
Phipson, T. L. Past and Present History of the Earth's Atmosphere, <i>noticed</i> .....	568	Quicksilver Mines, Russia.....	330
Physiographic Terms, Two New... 243		Railroad, around Lake Baikal.....	619
Physiography, Tennessee River Valley.....	163	— Assam, Bengal.....	759
— Washington (State).....	165	— Berber to Suakin.....	483
Physique du Globe et Météorologie. Par Alphonse Berget, <i>noticed</i> .....	119	— Cape to Cairo.....	234, 680
Piëns, C. New Seaport of Zeebrugge, Belgium, <i>with plan</i> .....	84	— Damascus to Mecca.....	484
Pilestrina, Map.....	201	— Pan-American.....	89, 466
Pioneer Spaniards in North America. By W. H. Johnson, <i>noticed</i> .....	253	— to Kumassi.....	44
Placer beds, Cape Nome.....	34	Railroads, Africa, Development of... 540, 542	
Plague, Bubonic.....	286	— Chile.....	19
Planetesimal Hypothesis, Chamberlin's.....	97	— "Good roads trains".....	730
Pleasure-Book of Grindelwald. By D. P. Rhodes, <i>noticed</i> .....	110	— Pyrenees.....	682
Polar Climate the Major Factor in the Evolution of Plants and Animals. By G. R. Wieland, <i>abstract</i> .....	142	Railways in Rhodesia. By E. H. S. Wright, <i>noticed</i> .....	772
— Project, Bénard's.....	490	Rain, British Isles, Distribution of, 1903. By H. R. Mill, <i>noticed</i> ...	564
Pôle, Conquête du. Par C. Bénard, <i>noticed</i> .....	572	Rainfall, Africa, South.....	543
Pontus, Journey of Exploration in. By J. G. C. Anderson, <i>noticed</i> ...	776	— and Crops, California.....	277
Population, Canada, French.....	459	— and Population in India.....	488
— Chile, <i>table</i> .....	21	— Chagres Basin.....	423
— of India.....	408-410	— England and Australia compared.....	50
— of the World.....	547	— Forests and.....	39
— Philippines.....	430	— Forests and, Hawaii.....	689
— United States.....	255	Rambaud, Alfred, Expansion of Russia, <i>noticed</i> .....	496
Port Arthur.....	94	Ranger, U. S. S., Soundings... 532, 534	
Portland Channel (Alaska).....	76	Ranke, Joh. von.....	245
Porto Rico, New Harbour in.....	474	Ratzel, Friedrich. Tributes to... 550	
Portuguese Colonies, Africa, Railroads in.....	542	Recherches sur les Instruments, les Méthodes, et le Dessin Topographiques. Par A. Laussedat, <i>noticed</i> .....	499
Précis de Géographie Économique. Par M. Dubois et J. G. Kergomard, <i>noticed</i> .....	248	Reconnaissance in Northern Alaska. Record, Geographical... 39, 89, 159, 230, 276, 352, 420, 474, 534, 608, 679, 752	
Present-Day Japan. By A. M. Campbell, <i>noticed</i> .....	783	Reed or Redfield Rocks, Disproof of the Existence of. By G. W. Littlehales.....	530
Problems of Geography, Present. By H. R. Mill.....	657	Reeves, E. A., on Geographical Surveying, etc. By G. W. Littlehales. 101	
Ptolemy, Edition of 1513.....	209	Researches, History of the Earth's Atmosphere. By T. L. Phipson, <i>noticed</i> .....	568
— Ruysch's.....	202	Reusch, Hans. Theory of glacier ice. 763	
Puerto Bermudez, Peru.....	749	Rey, Guido. Il Monte Cervino, <i>noticed</i> .....	503
Punic remains, Tripoli.....	737	Rhodes, Daniel P. Pleasure-Book of Grindelwald, <i>noticed</i> .....	110
Punta Arenas, Magellan Strait.....	17	Rhodesia, Railways in. By E. H. S. Wright, <i>noticed</i> .....	772
Pyrenees, Railroads across the.....	682	Rhodésie et Transvaal. Par A. Bordeaux, <i>noticed</i> .....	575
Quadra-Vancouver Monument, Nootka.....	126	Richesses Minérales des Possessions Russes en Asie Centrale. Par E.-D. Levat, <i>noticed</i> .....	778
Quaternary Time, Length of.....	242	Richter, Julius. Uganda, <i>noticed</i> ...	310
Quebec, Province, French in.....	450	Riings glacier.....	764
Quer durch Mexiko vom Atlantischen zum Stillen Ocean, von W. Schiess, <i>noticed</i> .....	718	Riparian villages, Canada.....	454
Questions Settled by the Award of the Alaskan Boundary Tribunal. By Robert Lansing.....	65	Ritter, Carl, his views on geography. 660	

	PAGE		PAGE
(River) Meanders, Cut-off, Development of. By W. S. Tower.....	389	Russia, Mount of the Cross.....	335
— Names of British Guiana. By J. Rodway.....	896	— Southern, and the Caucasus Mountains. By E. O. Hovey...	327
— Surveys in the U. S.....	87	Russland in Zahlen. By G. I. Kupezanko, <i>noticed</i> .....	110
Road, Cumberland.....	721	Russo-Japanese War Field, Climate of.....	359
Roads, Alabama.....	734	Ruwenzori Range, Uganda.....	542
— Convict labour on.....	731	— Region.....	618
— Cost of transportation.....	723-724	Ruysch's Ptolemy.....	202
— Good, increase the value of farms.....	725	Rzehak, A., und Makowsky, A. Führer in das Höhlengebiet von Brünn, <i>noticed</i> .....	314
— Influences toward the making of.....	728-729	Sabratha, Tripoli.....	737
— in the U. S. By A. P. Brigham.....	721	Sahara, Climate of, invading the Sudan.....	772
— "Good roads trains".....	730	— encroaching upon the Sudan..	44
— Illinois.....	734	— Western, Crossing the.....	482
— Iowa.....	722	Sailing-ship and the Panama Canal.	425
— Massachusetts.....	732	Saint Clair River Delta.....	89
— Materials tested.....	727	Saint-Dié, Gymnasium of.....	204
— National Good Roads Association, St. Louis.....	728	Saint Lawrence, Counties, North Shore.....	455
— New Jersey.....	734	— Lower. Influence of Geographic Environment on the. By E. C. Semple.....	449
— New York State.....	732-733	Salina Cruz, Mexican Port.....	537
— North Carolina.....	734	Salisbury, Rollin D. and Chamberlin, T. C. Geology, <i>noticed</i> .....	305
— tax.....	723	Salt from Lake Assal.....	362
— Pennsylvania.....	734	— Mines, Russia.....	330
— United States. Latimer-Brownlow Bill.....	727	Sand Dunes and their control.....	43
— Office of Public Road Inquiries.....	727	— Évolution Comparée des Sables. Par J. Girard, <i>noticed</i> .....	315
Rodway, James. River Names of British Guiana.....	396	Sanders, William. Results of the Census of England and Wales, 1901, <i>noticed</i> .....	444
Roman remains, Tripoli.....	737, 739	Sara tribe, French Congo.....	770
Rome, Central Italy and. Baedeker, <i>noticed</i> .....	253	Savoy, Glaciers.....	124
Round Kangchenjunga. By D. W. Freshfield, <i>noticed</i> .....	115	Scandinavia, Thirty Seasons in. By E. B. Kennedy, <i>noticed</i> .....	312
— Mount McKinley. By F. A. Cook.....	321	Scherer, James A. B. Japan To-day, <i>noticed</i> .....	446
Royal Geographical Society Annual Awards.....	243	Schiess, Wilhelm. Quer durch Mexiko vom Atlantischen zum Stillen Ocean, <i>noticed</i> .....	718
— House of the.....	478	Schlagintweit takes Gaurisankar for Mt. Everest, 1855.....	746
— Research Department.....	45	Schöner's Globe, 1515.....	211
Rubber Districts, Eastern Bolivia..	681	Schrader, F. C. Report on N. Alaska.....	403
— tree, Africa.....	768	Scientific Station north of the Arctic Circle.....	51
Ruge, Sophus. Obituary.....	64, 241	Scotia expedition.....	547
Rumania not in Balkan Peninsula..	426	Scotland, Climate and Character in.	479
Russell, H. C. Astronomer, Retirement of.....	384	Scott, R. F. Awarded Elisha Kent Kane medal.....	549
— I. C. Bulletins by, <i>noticed</i> ..	82-83	Scottish Antarctic Expedition.....	47, 489
— North America, <i>noticed</i> ..	702	— Lakes, Surveys.....	91
Russia, Dariel Gorge.....	333	Seasons of crops, Egypt.....	756
— Expansion of. By A. Rambaud, <i>noticed</i> .....	496	Sebkhas, salt marshes, Tripoli.....	737
— By F. H. Skrine, <i>noticed</i> .....	309	Sechuan, Economic Development..	168
— Georgian Military Road.....	332		
— in-Europe, Soils of.....	428		
— Mineral Springs.....	330		
— Mines.....	330		

	PAGE		PAGE
Seismology, New.....	634	Statistisches Taschenbuch, Hart-	
Semple, Ellen Churchill. Influence		leben's, <i>noticed</i> .....	570
of Geographic Environment on		Steindorff, Geo. Journey to the Siva	
the Lower St. Lawrence.....	449	Oasis .....	680
— — — — — Tribute to Fried-		Stevenson, E. L. Waldseemüller	
rich Ratzel.....	553	and the Lusitano-Germanic Car-	
"Sensible Temperatures." By R.		tography of the New World.....	193
DeC. Ward.....	129	Stieler's Atlas, History of.....	264
Seward Peninsula, Alaska.....	33, 35	— — — — — Parts <i>noticed</i> ..	106, 248, 556, 767
Sextant Observations for Determin-		Stobnicza, Maps.....	209
ing Geographical Positions. By		Stone Reefs of Brazil. By J. C.	
G. W. Littlehales.....	138	Branner, <i>noticed</i> .....	497
Shari River Basin, Chevalier Mis-		Stransky, Gottfried, Traveller in	
sion.....	482	Albania.....	167
— — — — — region, Central Africa..	767-772	Studia Pontica. By J. G. C. Ander-	
Shelbyville Moraine.....	147	son, <i>noticed</i> .....	780
Shirwa, Lake, Disappearance of....	44	Stuntz, H. C. Philippines and the	
Shore-lines, Subterranean.....	421	Far East, <i>noticed</i> .....	250
Siberian Klondike, In Search of a.		Sturdza, A. A., on Rumania.....	426
By W. B. Vanderlip and H. B.		Suakin, Railroad from Berber to... 483	
Hulbert, <i>noticed</i> .....	249	Subterranean Shore-lines.....	421
Sibut, Fort. [French Congo] Agri-		Sudan Almanac, 1904.....	367
cultural Experiment station.....	768	— Egyptian, Railroads in.....	542
Sierra Leone, W. Africa, History of		Summer in Turkestan. W. M.	
the Colony of. By J. J. Crooks,		Davis.....	217
<i>noticed</i> .....	713	Sundbärg, Gustav. Sweden, <i>noticed</i> ..	565
Silberer, Herbert. Viertausend Kilo-		Sunshine and Influenza.....	539
meter im Ballon, <i>noticed</i> .....	304	Survey, New Zealand Lakes.....	620
Silent Trade, The. By P. J. H.		— U. S. Geological, History of	
Grierson, <i>noticed</i> .....	710	the.....	357
Simplon Tunnel.....	167	— — — — — Publications, <i>noticed</i> ,	
— — — — — Completion delayed.....	761	33-36, 81-83, 341-343, 357, 473,	
Siva Oasis, Archæological Journey		605-608	
to.....	680	Surveys, Geological, Notes on....	29, 81
Skrine, Francis Henry. Expansion		— Northern Nigeria.....	169
of Russia, <i>noticed</i> .....	309	— Scottish Lakes.....	91
Sleeping Sickness, Cause of.....	45	— Topographic, Alaska, 1904... 699	
— — — — — Congo Basin.....	755	— — — — — United States.....	676, 749
— — — — — Katanga.....	615	Sverdrup, Otto. New Land, <i>noticed</i> ..	774
Smith, J. Russell. Economic Geo-		Sweden and Denmark, Norway and	
graphy of Chile.....	1	Baedecker, <i>noticed</i> .....	254
Smithsonian Report, 1903, <i>noticed</i> ..	764	— Its People and Its Industry.	
Snake River Plains, Idaho, Geology,		Gustav Sundbärg, <i>noticed</i> .....	565
etc., of.....	82	Swedish Antarctic Expedition, 1902-	
Snussi, Congo chief.....	769	'03.....	22
Société de Géographie, Paris. Medal		— — — — — Pictures taken.....	285
awarded to Peary.....	448, 693	Switzerland, Picturesque and Des-	
Soufrière of Guadeloupe, Cone.....	518	criptive. By J. Cook, <i>noticed</i> ... 717	
— — — — — Cratères de Na-		Symons, Thomas W. Projected New	
poléon.....	524	Barge Canal of the State of New	
— — — — — Eruptions.....	526	York.....	257
— — — — — Fumarolles.....		Syrtis, Tripoli.....	742
— — — — — 518, 521, 524, 526		Table Mountain [Cape Town],	
— — — — — Grande. By E. O.		Water from clouds on.....	236
Hovey.....	513	Tadoussac, on Saguenay River.....	457
— — — — — Meteorology.....	516	T'ahar Plateau, Tripoli.....	740, 742
— — — — — Morne l'Echelle.....	526-529	Tampico Harbour works described..	423
— — — — — Springs.....	528	Tarhouna Plateau, Tripoli.....	738
Sowerbutts, Eli. Obituary.....	435	Tarim River. By Sven Hedin, <i>no-</i>	
Spain, Trade with Germany.....	686	<i>noticed</i> .....	780
Stanley, Henry M. Obituary.....	302	Tarr, Ralph S. New Physical Geo-	
		graphy, <i>noticed</i> .....	113

	PAGE		PAGE
Tasmania, Glaciation of.....	545	— Great Syrtis.....	742
Temperatures, Sensible. By R. De C.		— Mizda.....	742-743
Ward.....	129	— Olive plantations at Nefousa..	742
Tennessee River valley, Physiogra-		— Population, Berber... 740-741,	744
phy of.....	163	— Distribution of.....	744
Thimm, C. A. Dutch Self-Taught,		— Troglodyte.....	740-741
<i>noticed</i> .....	776	— Port of.....	736
Thirty Seasons in Scandinavia. By		— Remains of ancient cities. ....	737, 739, 742
E. B. Kennedy, <i>noticed</i> .....	312	— Shore of.....	736
— Years in Madagascar. By T.		— Soffedjin, Wady.....	742
T. Matthews, <i>noticed</i> .....	783	— Structure of.....	744
Through Canada in Harvest Time.		Troglodyte population, parts of	
By J. Lumsden, <i>noticed</i> .....	252	Tripoli.....	740-741
Thousand Islands Region.....	475	Trotter, Mrs. A. P. Old Cape	
Tibet, Effects of Altitude in.....	486	Colony, <i>noticed</i> .....	311
— Le. Par F. Grenard, <i>noticed</i> ..	566	— Spencer. Geography of Com-	
Tien-tsin, Electric Cars in.....	432	merce, <i>noticed</i> .....	57
Tiflis.....	336	Tsetse flies and the Sleeping Sickness	755
Time, Quaternary.....	242	Tundra, Ice-sheets buried in the....	538
"Timehri," rock-pictures, British		Tunnel, Simplon.....	167
Guiana.....	397	— Completion delayed....	761
Tirol und Vorarlberg. Von Max Haus-		Turkestan, Architecture in., &c. By	
hofer, <i>noticed</i> .....	109	O. Olufsen, <i>noticed</i> .....	573
Titicaca, Lake, Vegetation near....	754	— In Russian. By A. M. B.	
Toll, Baron von, Fate of..... 238,	432	Meakin, <i>noticed</i> .....	312
— Reward for informa-		— Summer in. W. M. Davis....	217
tion regarding.....	128	Turtle Mountain, Great Landslide	
Topographic Atlas, United States,		on.....	272
Value of.....	688	Typhoon of Oct. 25-26, 1903.....	485
— Surveys, Alaska, 1904. Notes		Ubangi and Lake Chad, Exploration	
on.....	699	between.....	767
— Ceylon.....	544	Überseeische Deutschland, Das, <i>no-</i>	
— United States..... 676,	749	<i>ticed</i> .....	777
Topography, Fossil.....	281	Uganda. By J. Richter, <i>noticed</i> ..	310
— Instruments, les Méthodes et		— Conditions in.....	756
le Dessin Topographiques. Par		— Eastern. By C. W. Hobley,	
A. Laussedat, <i>noticed</i> .....	499	<i>noticed</i> .....	120
Tower, W. S., Development of Cut-		— Handbook, <i>noticed</i> .....	574
off Meanders.....	589	— Protectorate and the Nile	
Trade, Silent. By P. J. H. Grierson,		Quest.....	52
<i>noticed</i> .....	710	— Wonderful Story of. By J. D.	
Transactions of the Society..... 61,		Mullins, <i>noticed</i> .....	496
125, 191,	255	Uhlig, C. Ascends Kilimanjaro... 754	
Trans-Andean route in Peru.....	747	Umlauf, F. Kleines Statistisches	
Transvaal, Glaciated Surfaces and		Taschenbuch, <i>noticed</i> .....	570
Deposits in the.....	480	United States. Aboriginal Pottery	
— Meteorological Service... 543,	758	of the Eastern.....	269
Rhodésie et. Par A. Bordeaux,		— Base Maps.....	98
<i>noticed</i> .....	575	— Board on Geographic	
Travels of Charles A. Lesueur in the		Names..... 64, 637,	719
U. S.....	608	— Coal Production, 1903... 610	
Treaty Ports, China.....	432	— Coast and Geodetic Sur-	
Trees, Wind-Blown.....	244	vey, Annual Report, 1903.....	228
Tributes to Friedrich Ratzel.....	550	— Deserts of the.....	506
Trilles, Father, on an unknown ani-		— Deserts of the South-	
mal.....	127	west. By A. J. Burdick, <i>noticed</i> .	509
Tripoli, An Expedition to. By the		— Geological exploratory	
Vicomte de Mathuisieulx.....	736	work practically complete.....	750
— Barrenness, how produced....	744	— Geologic Atlas, <i>noticed</i> .	
— Berbers, Nefousan, formerly		104, 160, 173, 246, 297, 554	
Christian.....	741		
— Eastern, cultivated.....	743		

	PAGE		PAGE
United States. Geological Survey		Wagner, H. History of Stieler's	
Catalogue and Index, <i>noticed</i> ....	48	Atlas, <i>Abstract</i> .....	264
— — — — — History of the.	357	Waldseemüller and the Cartography	
— — — — — Publications,		of the New World. By E. L.	
<i>noticed</i> , 33-36, 81-83, 341-343, 357,		Stevenson .....	193
473, 605-608		Walfish Bay, Mud Island at.....	362
— — — — — River Surveys.	87	Wanderungen und Forschungen...	
— — — — — Government Reports, Va-		in Kamerun. Von F. Hutter, <i>no-</i>	
lue of.....	668	<i>ticed</i> .....	382
— — — — — Great Basin Mountain		Ward, C. S. North Devon and	
Ranges .....	535	North Cornwall, <i>noticed</i> .....	254
— — — — — Handbook, Baedeker, <i>no-</i>		Ward, Robert DeC. "Sensible	
<i>ticed</i> .....	569	Temperatures." .....	129
— — — — — Negroes in.....	609	Washington (State) Geological Sur-	
— — — — — Population .....	255	vey.....	30
— — — — — Roads, bad, Loss from ..	723	— — — — — Physiography of.....	165
— — — — — Good, in the. By		Wassijaure scientific station.....	51
A. P. Brigham .....	721	Water, Artesian, from Moraine ....	420
— — — — — Inquiry Office.....	727	Waugh, Sir Andrew, named Mt.	
— — — — — Statistical Atlas, <i>noticed</i> ..	60	Everest, 1852.....	745-746
— — — — — Topographic Atlas, Value		Weather, Europe, North Western..	91
of .....	688	— — — — — forecasts, Demtschinsky's... 50	
— — — — — Topographic Surveys. 676,	749	— — — — — Iceland .....	91
— — — — — Travels of Chas. A. Le-		Wege und Entfernungen zur See im	
sueur in .....	608	Welt-Verkehr, von R. Jannasch,	
Uruguay, Argentine relief steamer.	27	<i>noticed</i> .....	311
Utah, Natural bridges of.....	534	Weintz, H. J. Japanese Grammar	
Valleys, Hanging.....	422	Self-Taught, <i>noticed</i> .....	776
— — — — — Colorado .....	536	West Indian Neighbors, Our. By	
Valparaiso Harbor .....	230	F. A. Ober, <i>noticed</i> .....	776
Vancouver and Quadra Monument,		Wheeling, U. S. S. Final Search	
Nootka.....	126	for Reed or Redfield Rocks. 533-534	
Vanderlip, W. B., and Hulbert, H. B.		White Cañon, Utah, Natural Bridges	534
In Search of a Siberian Klondike,		White, James. Dictionary of Alti-	
<i>noticed</i> .....	249	tudes, Canada, <i>noticed</i> .....	231
Vanino, L., and Neger, F. W. Der		Wieland, G. R. <i>Abstract of Paper,</i>	
Paraguay-Tee (Yerba Mate), <i>no-</i>		Polar Climate in Time the Major	
<i>ticed</i> .....	310	Factor in the Evolution of Plants	
Varenus, his geography, 1650.....	659	and Animals.....	142
Vegetation shown on maps .....	96	Wilhelm, Leopold. Obituary.....	64
Verkhoyansk, coldest region of the		Willis, Bailey. Return from Asia..	685
Earth.....	546	Wilson, Rufus Rockwell. Burnaby's	
Vermilion Iron-Bearing District of		Travels through N. America, <i>no-</i>	
Minnesota .....	81	<i>ticed</i> .....	711
Victoria Falls, Improvements at... 758		Wind-Blown Trees. ....	244
— — — — — Nyanza, Meduse in.....	93	Winter, Francis P. Report on Brit-	
— — — — — Variations of level.....	612	ish New Guinea, <i>noticed</i> .....	691
Viertausend Kilometer im Ballon.		Wisconsin University, Commercial	
Von H. Silberer, <i>noticed</i> .....	304	Geography in.....	422
Vignaud, Henry. Critical Study of		Wonderful Story of Uganda. By J.	
the Various Dates assigned to the		D. Mullins, <i>noticed</i> .....	496
Birth of Columbus, <i>noticed</i> .....	505	Wood, H. Identification of Hima-	
Vineyards, Climatic influence on... 540		layan Peaks.....	744
Volcano of Colima.....	42	Workman, Dr. and Mrs., in the	
— Soufrière of Guadeloupe,		Himalayas.....	51, 107
Grande. By E. O. Hovey.....	513	World, Ancient (Chinese) Map of	
Volcanoes, Atlas of.....	436	the. H. B. Hulbert.....	600
von Erlangen in N. E. Africa.....	363	— — — — — Complete Map needed.....	664
von Grunau, Baron. Journey to Siva		— — — — — New, Early Cartography of the.	
Oasis.....	680	By E. L. Stevenson.....	193
von Zittel, Karl Alfred. Obituary.	367	— — — — — Population of the.....	547
Wady Môjib, Cañon, on Dead Sea.	587		

	PAGE		PAGE
Wright, E. H. Smith. Railways in Rhodesia, <i>noticed</i> .....	772	Yukon, Coal resources.....	342
Yaka, Family Fetish.....	412	Zanzibar, etc. Handbook, <i>noticed</i> .....	574
Yalu River, Lower.....	235	Zeebrugge, Belgium. New Seaport. By C. Piens, <i>with plan</i> .....	84
Yankee on the Yangtze. By W. E. Geil, <i>noticed</i> .....	716	Ziegler-Fiala Arctic Expedition....	488
Yellow Fever Mosquito, Distribution of.....	242	Zkara, a Christian Tribe in Morocco.....	343
Yellowstone National Park. By H. M. Chittenden, <i>noticed</i> .....	251	Zlitten, Arabs of.....	738
— — — — — Death Gulch.....	278	Zwanzig Jahre in Süd Afrika. Von A. Einwald, <i>noticed</i> .....	717
		Zybikow's Visit to Lhasa.....	95

## MAPS AND ILLUSTRATIONS.

MAPS.			
Alaska, Northern, <i>facing</i> .....	403	Tripolitaine proprement dite, <i>facing</i> ..... 736	
Alaska, S. E., showing Boundary, <i>facing</i> .....	128	World, Ancient Chinese, <i>facing</i> ... 600	
Barge Canal, N. Y. State, <i>facing</i> .....	320	World, Star Projection ..... 365	
Brazil and Bolivia, New Frontier, <i>facing</i> .....	256	Zeebrugge, Belgium, Plan of Port, <i>facing</i> ..... 84	
Chile, Economic, <i>facing</i> .....	65	ILLUSTRATIONS.	
Deep-Sea Soundings, U. S. S.S. <i>Ranger</i> and <i>Wheeling</i> , <i>facing</i> ....	530	Baku, Oil Wells ..... 219	
Gaurisankar and Mt. Everest, <i>sketch</i> .....	745	Gaussberg, Kaiser Wilhelm II. Land 569	
Graham Land Region.....	23	Guam, Five views. .... 386-394	
Guam, <i>facing</i> .....	385	Kano, from Dallah Hill (Central Sudan)..... 158	
Mt. McKinley Region, Alaska.....	326	Khirgis Villager and Son. .... 225	
Nile, showing work of Chaillé-Long, <i>facing</i> .....	346	Kurds in the Kopet Dagh Mountains..... 220	
Pan-American Railway, <i>facing</i> ....	512	Mt. McKinley (Alaska)..... 324	
Peru, Central Route of.....	748	Ratzel, Friedrich. Portrait..... 550	
Portland Channel.....	77	River Meanders, <i>figures</i> ...590, 592, 594	
Shelbyville Moraine (sketches illustrating).....	147, 149, 151	Samarkand, Three views. 222, 223, 224	
Soufrière, Guadeloupe, <i>facing</i> ....	513	Soufrière, Grande, of Guadeloupe, Nine views. .... 515-529	
		Turtle Mountain Landslide.... 272, 273	